Strategic Studies Quarterly

An Air Force-Sponsored Strategic Forum on National and International Security

USSTRATCOM 2016 VOLUME 10, NO. 5

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DEPARTMENT OF DEFENSE
UNITED STATES STRATEGIC COMMAND

Dear Symposium Members,

Welcome to the 2016 USSTRATCOM Deterrence Symposium. Today's dynamic and complex security environment makes strategic deterrence more important than ever. Future conflicts will not be contained within prescribed borders, limited domains, or single functional areas. Whether deterring nuclear aggression or addressing threats in space and cyberspace, our actions and capabilities must make clear that no adversary can escalate their way out of a failed conflict and that restraint is always a better option.

Our nuclear deterrent enterprise continues to play a major role in deterring our adversaries while simultaneously assuring our allies. Each leg of the triad is vital to our efforts, but those capabilities alone are not enough. A safe, secure, effective and ready strategic deterrent also includes tankers to refuel our nuclear-capable bombers; effective early indications and warning of incoming threats; assured National and Nuclear Command, Control and Communications; reliable warheads; a credible missile defense system against rogue nations; a resilient space and cyberspace architecture; and a robust conventional force.

The articles in this special edition of Strategic Studies Quarterly, as well as an elite line up of speakers and panels during this symposium, will stretch your critical thinking about deterrence and offer insights about how the US will remain a formidable, global power. I encourage you to lend fresh, innovative ideas to tough strategic problems. Thank you for your contribution to this symposium and to our national security.

C. D. HANEY
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Why US Nuclear Force Numbers Matter

The US debate about nuclear forces and policy often descends into arcane details. These details can be important, but it also is important to address a basic question: For effective deterrence, does the United States need greater numbers and different types of nuclear capabilities than the very limited numbers and types of nuclear weapons deemed necessary to threaten an opponent's society? While it appears incongruous, a minimum US nuclear deterrent typically is defined as a second-strike, or retaliatory, capability sufficient to threaten the destruction of an opponent's societal or urban/industrial assets, such as "a nation's modern economy, for example, electrical, oil, and energy nodes, [or] transportation hubs."[1]

That adequacy standard for deterrence—the nuclear capabilities necessary to threaten the destruction of an opponent's societal assets—is "easy" to meet in quantitative and qualitative terms given the high vulnerability of unprotected, fixed societal targets to nuclear strikes.[2] Indeed, the number of US second-strike weapons typically considered adequate to meet a minimalist standard for deterrence ranges from "several" weapons to hundreds of weapons.[3] Such numbers are modest compared to the approximately 2,000 US nuclear weapons reportedly now deployed.[4]

Minimalists typically criticize as unnecessary and destabilizing US nuclear capabilities beyond those necessary for threatening opponents' societies and populations. Indeed, these are the criticisms now leveled against the Obama administration's fledgling US nuclear modernization programs.[5] The connection between the advocacy of minimal US nuclear capabilities and a deterrence policy of targeting opponents' societies has been explicit for decades. For example, in 1961 a prominent academic commentator observed, "Would the Soviets be deterred by the prospect of losing ten cities? Or fifty cities? No one knows, although one might intuitively guess that the threshold is closer to ten than to either two or fifty."[6]

More recently, two prominent commentators recommended a US "responsive force" of 400–500 nuclear warheads because this number of weapons would be adequate to target Russian sites, "affecting industrial recovery—the major nodes in the electric power grid and air, ground,

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This article is a revised version of the original published by the National Institute for Public Policy, Information Series (http://www.nipp.org/wp-content/uploads/2016/03/IS-404.pdf).

and rail transportation systems, as well as major industrial sites."[7] In 2010 a minimum deterrence-oriented assessment by US Air Force personnel concluded that a US nuclear force of "311 weapons" would be more than adequate because, "there is not a state on the planet that could withstand that sort or punishment or a leader who would run that sort of risk."[8]

The critical question here is, how much is enough for effective deterrence? As illustrated above, precise answers derived from the minimum deterrence approach range from several weapons to hundreds. However, every Republican and Democratic administration for five decades has rejected this minimalist standard for and approach to nuclear deterrence.[9] There are six basic reasons for rejecting the minimalist standard of adequacy for US nuclear capabilities that everyone who cares about this subject should understand.

First, as illustrated above, there are many confident claims regarding the number of nuclear weapons adequate for deterrence. The problem with all such claims is that no one knows with precision the minimal US nuclear capability necessary to deter attack—now or in the future. Omniscience would be required to predict how many and what types of weapons will deter across a spectrum of circumstances and opposing leaderships. And, if that number somehow could be known, it would likely change rapidly with shifting circumstances. That is, the US requirement for effective deterrence is not some known, set number of weapons or capability; it will change depending on the opponent, the time, and the context.[10]

Developments in circumstances that can shift deterrence requirements may be technical, political, operational, or even personal to a given leadership. For example, the possibility that a US nuclear system could experience an unexpected reliability problem that would disable or degrade US weapons may best be mitigated by having a level of diversity and overlapping capabilities in the deterrent arsenal. This factor alone could lead US force requirements beyond the typical minimal definitions of adequacy. The goal of preventing nuclear war is so crucial that it is better to hedge with flexible, diverse, and overlapping capabilities rather than risk the failure of deterrence due to unknown or unpredictable developments or otherwise having too few or the wrong types of nuclear forces needed to deter. We should not plan only for a minimal US deterrent because no one knows what that capability is or how deterrence requirements may shift. Correspondingly, every US administration during the

last five decades has concluded that US nuclear deterrence forces should be diverse, flexible, and overlapping to help ensure the US always possesses the capabilities necessary to deter attack across a wide spectrum of threats and shifting circumstances.[11]

Second, to pose a retaliatory deterrent threat, US nuclear forces must be able to withstand an opponent's "first-strike" attack. US forces manifestly vulnerable to a first strike would be useless as a retaliatory deterrent threat. Hence, the US deterrent must be sufficiently large and diverse to survive—under all conditions—a nuclear first strike by a determined foe. This requirement has led to a long-term consensus in favor of ensuring the United States possesses a sufficient number of nuclear weapons to survive an attack and a diverse nuclear triad of platforms for those weapons—nuclear bombers, sea-based ballistic missiles and land-based, intercontinental ballistic missiles. The diversity of this overlapping triad of nuclear systems, with their different operations and locations, helps to ensure that under all conditions an opponent could not reasonably anticipate destroying the US retaliatory nuclear deterrent in a first strike. This is one of the rationales for and great values of the US nuclear triad that again takes US nuclear requirements beyond the numbers typically associated with a minimum deterrent.

Third, as noted above, intentionally planning to destroy societal or urban-industrial centers establishes a minimal, easy-to-meet set of deterrence requirements for US nuclear capabilities. But, it also involves intentional threats to kill innocents and noncombatants on a massive scale. Thus, it is widely considered immoral, a potential violation of international law, and inconsistent with the Just War tradition. Instead, the United States should strive for deterrence capabilities that are not limited to or dependent upon threatening opponents with societal destruction. The US nuclear deterrent should instead have the diverse and flexible nuclear capabilities necessary to pose a threat to a variety of other types of targets and, indeed, to avoid to the extent possible an opponent's societal centers—thereby potentially minimizing the destruction of an opponent's innocent noncombatants. This deterrence standard again imposes US force requirements that are likely more diverse qualitatively and larger quantitatively than typically is deemed adequate to meet the minimal deterrence standard of threatening the destruction of an opponent's population and societal assets.

It should be noted that this particular point stings advocates of minimal US nuclear capabilities. They clearly want to avoid being charged with advocacy of an approach to deterrence that so offends all humanitarian concepts. Consequently, they often claim in response that the types and scale of US nuclear capabilities and the targeting plans underlying US deterrent threats essentially make no real difference in the prospective level of societal destruction in a nuclear war. If so, then a minimal deterrent is no guiltier of violating humanitarian norms than other approaches to nuclear deterrence.[12] There is, however, no doubt whatsoever that the types of nuclear weapons and targeting plans can dramatically affect the levels of destruction and casualties—with the weapons and targeting plans advocated by minimalists unsurprisingly causing the greatest levels of societal destruction. Many careful studies over decades have reached this conclusion.[13] The United States should not help ensure that any use of nuclear weapons leads to unmitigated levels of societal destruction by adopting an approach to deterrence that is *"easy"* simply because societal targets are so vulnerable to nuclear weapons that few are needed to threaten such targets.

Fourth, and related to the above, for US deterrence strategies to function most reliably, the US deterrent must be able to threaten retaliation against those potentially different types of assets that opponents value most highly. In some cases, the minimalist deterrence threat to destroy an opponent's societal infrastructure as the basis of US deterrence strategy will not threaten what an opponent values most. There are many historical examples wherein leaders have willingly and knowingly accepted a high risk of societal destruction in pursuit of a goal judged to be more important than avoiding that risk.[14] In short, threats against an opponent's society embraced by minimalists may deter in some cases; however, in other cases, the opposing leader's goals and values may suggest an alternative approach to deterrence is necessary and require more and different types of US nuclear forces.

During the Cold War, for example, US deterrence policy reportedly was based in part on the expectation that Soviet leaders placed highest value not on urban-industrial centers but on their political and military assets, including the Soviet control structure itself and Soviet military/nuclear capabilities. As the Carter administration's secretary of defense, Harold Brown, said in 1980, the US deterrent should be capable of posing a threat to "what the Soviets consider most important to them,"[15]

which could include Soviet conventional and nuclear military forces, the Soviet political and military control structure, and military industry.[16] Thus, US forces had to be large enough and possess the diverse qualities necessary to threaten, for deterrence purposes, the military and political assets apparently valued most highly by the Soviet leadership—which were numerous and often protected. This was a standard for US deterrent forces well beyond the relatively small number of weapons typically deemed adequate to meet the minimal deterrence standard of threatening society.

In today's international threat context, there is no reason to assume that current and future opponents, potentially including Russia and China, will not similarly place greatest value on numerous assets that are realistically vulnerable only to US nuclear threats and impose higher standards of adequacy on US deterrence capabilities than a minimal deterrent can.[17] Again, because the US goal of deterring war is so critical, the size and diversity of the US nuclear arsenal for effective deterrence must be maintained accordingly.

Fifth, the minimum deterrence approach to sizing US nuclear forces provides little, if any provision for the failure of deterrence. For example, in most plausible contingencies, it would provide a president only the most miserable options possible if the United States or allies were to suffer a nuclear attack. In the event of a nuclear attack, a president certainly would want the scope and size of any US response to help discourage any further nuclear escalation by the opponent. Yet, retaliating against, say, many Russian or Chinese societal targets—per minimum deterrence notions—would be likely to undo whatever targeting restraint Moscow or Beijing might have practiced in the initial attack and would do little or nothing to protect the United States from further attack. In 1962 Secretary of Defense Robert McNamara emphasized precisely this point: "In the event of war, the use of such a force against the cities of a major nuclear power would be tantamount to suicide."[18] Similarly, in 1967, then-Secretary of the Air Force (and later Secretary of Defense), Harold Brown said, "the execution of the option to destroy Soviet population and industry would be our poorest choice."[19] There remains almost no conceivable circumstance in which US retaliation against numerous societal targets in the event of an initial Russian or Chinese attack could help to restore deterrence and limit the carnage. The president, instead, would want flexible and diverse US nuclear retaliatory options to have available

a response best suited to the crisis and to limiting further escalation and levels of destruction.

The hope that escalation can be limited in the event of war may be a faint hope, but the United States should not be limited, by the narrowness of its capabilities and rigidity of its planning, to a response that would likely ensure that nuclear escalation proceeds unabated. Again, the US deterrence goal should be, and has been, to have flexible and diverse response options for the purpose of deterring further escalation and limiting damage,[20] not the very narrow types of responses imposed by a minimum deterrence approach to sizing US forces. This point is not a rejection of deterrence or a call for a US "nuclear war-fighting" policy as some continually and mistakenly charge;[21] it is a call for diverse US capabilities that make available to the president a variety of options best suited for deterrence and reestablishing deterrence and limiting nuclear escalation in the event deterrence fails. Once again, this goal can require a US arsenal well beyond the number and types of weapons deemed adequate for minimum deterrence.

Finally, the United States has formal extended deterrence responsibilities to provide a "nuclear umbrella" for more than 30 allies. Many of these allies (particularly those in close proximity to Russia and China) consider the US nuclear umbrella essential to their security. However, a minimalist US nuclear deterrent capability limited to threatening an opponent's society may be judged incredible—as in, not believed by the opponent—as an extended deterrent, because of the well-recognized US desire to limit civilian destruction in its military operations and, again, because of the likelihood that a US nuclear response against an opponent's society could lead that opponent simply to launch strikes in return against US urban-industrial centers. In this case, a US extended deterrent threat focusing on an opponent's society essentially would be, as Secretary McNamara warned, a US threat to commit national suicide on behalf of an ally. Opponents may understandably doubt that any US president would ever choose to proceed along such a course. Indeed, former Secretary of State Henry Kissinger long ago publicly explained to allies that they should *never* expect the United States to follow such a course.[22] Even if the United States clearly possesses a minimal deterrent capability, an opponent's doubts about its credibility would render a US minimal nuclear deterrent threat of little deterrent value. This potential credibility problem is not a vestige of the Cold War. Given Russia's new

expansionism and numerous, explicit nuclear threats to US allies, it is again a serious contemporary concern.

Consequently, for decades US policy has been to have a diversity of flexible and limited nuclear response options, including dual capable aircraft (DCA) deployed in North Atlantic Treaty Organization countries that are intended to be more credible for extended deterrence purposes than a minimal deterrent. Department of Defense officials in the Obama administration fully recognize the continuing need for diverse nuclear options and the corresponding continuing need for the US triad and DCA. Why? Because "sustaining a diverse set of U.S. nuclear capabilities is essential for the role they play in regional deterrence and assurance."[23]

Conclusion

For all of the reasons noted above, US officials have long recognized a minimalist US nuclear arsenal as inadequate to support US deterrence requirements. Minimal US nuclear force numbers may sound appealing to some, but in general, the smaller and less diverse the US force is, the less survivable it is, the less flexible it is, the more narrow the available US deterrent threat options are, and the less credible it is likely to be in some potentially critical contingencies.

It must be acknowledged that there is considerable speculation regarding "how much is enough?" in both the minimum-deterrence approach to sizing the US nuclear force and the decades-long US approach that instead seeks flexible, diverse, and overlapping capabilities. But, while both approaches involve speculation, the now-traditional US approach to deterrence is by far the more prudent in a subject area that begs for prudence.

Why so? Because deterrence is an art that includes numerous moving parts with some inherent and irreducible uncertainties. How much is enough for effective deterrence is not fully predictable because we have an inherently limited capacity to predict reliably and precisely how foreign leaders will think and act in crises. Given the great variety of international threats and the equally great variation in the perceptions, values, and decision-making modes of foreign leaders, no one knows with any level of confidence that a small, minimum deterrence-oriented US arsenal will deter on any given occasion—much less universally for all plausible occasions now and in the future. As a result, the most imprudent approach

to deterrence is to have an *"easy,"* small, and narrow set of US deterrence threat options based on the presumptions that opponents will be deterred by nuclear threats to their societies and that the United States can make such threats credibly. The effective functioning of deterrence is too important to depend on the assumption that the United States will face only opponents who are susceptible to minimum deterrent threats.

US planning must recognize the possibilities that other approaches to deterrence may be necessary and that deterrence may fail. Yet as noted above, minimum deterrence will lack credibility in plausible cases and makes no useful provision for the failure of deterrence. Indeed, it likely maximizes the prospects for uncontrolled societal destruction if deterrence fails. The functioning of deterrence is not foolproof, and thus, making no provision for its failure is grossly imprudent.

In summary, while all approaches to determining how much is enough for deterrence involve speculation about how opponents will think and act, for the United States, the possession of flexible, diverse, and overlapping capabilities is the most prudent approach. This is particularly so in the contemporary threat environment, which is characterized by an expansionist, revanchist, and hostile Russia that is adding to its nuclear arsenal and making explicit nuclear first-use threats and also by an increasingly aggressive, expansionist China that also is adding to its nuclear capabilities.[24]

Advocates of a minimal US nuclear deterrent continue to call for revising US nuclear deterrence policies and targeting plans per the minimum deterrence adequacy standard to facilitate lower US nuclear force requirements.[25] They actually argue against diverse and flexible US forces, because those attributes suggest the requirement for retaining larger US force numbers than they prefer.[26] But, given the stark reality of increasing nuclear threats to the United States and its allies, US deterrence policies should not be determined by how well they facilitate easy standards and provide a rationale for eliminating US nuclear capabilities; US deterrence policies serve purposes other than rationalizing the elimination of US nuclear forces. The adequacy of US nuclear forces and policies should be determined primarily by the requirements for deterring enemies and assuring US allies in the most effective and prudent manner possible. The US goal must be for deterrence to work in all cases, which again suggests the value of capabilities that are adaptable for deterrence purposes across a wide variety of potential circumstances.

Consequently, the reasons described here for rejecting a minimalist US nuclear deterrent force continue to be sound. SSQ

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Notes

1. See for example, Hans M. Kristensen, Robert S. Norris, Ivan Oelrich, *From Counterforce to Minimal Deterrence*, Occasional Paper no. 7 (Washington, DC: Federation of American Scientists and the Natural Resources Defense Council, April 2009), 31–32, see also 2 and 43–44, http://docs.nrdc.org/nuclear/files/nuc_10042901a.pdf.

2. Robert Jervis, "Why Nuclear Superiority Doesn't Matter," Political Science Quarterly 94, no. 4 (Winter 1979–80), 617–18. See also, Steven Pifer and Michael E. O'Hanlon, *The Opportunity: Next Steps in Reducing Nuclear Arms* (Washington, DC: Brookings Institution Press, 12 October 2012), 20–21.

3. *Several* is the level identified as adequate in James Wood Forsyth Jr., B. Chance Saltzman, and Gary Schaub Jr., "Minimum Deterrence and Its Critics," *Strategic Studies Quarterly* 4, no. 4 (Winter 2010), 7, http://www.au.af.mil/au/ssq/2010/winter/forsythsaltzmanschaub.pdf.

4. Hans M. Kristensen and Robert S. Norris, "Nuclear Notebook: United States Nuclear Forces, 2016," *Bulletin of the Atomic Scientists* 72, no. 2 (2016), 63–64.

5. See for example, Center for Arms Control and Nonproliferation, "Is a New Nuclear Cruise Missile Necessary?," (fact sheet, Center for Arms Control and Nonproliferation, 2 February 2016), http://armscontrolcenter.org/is-a-new-nuclear-cruise-missile-necessary/.

6. Glenn H. Snyder, *Deterrence and Defense: Toward a Theory of National Security* (Princeton, NJ: Princeton University Press, 1961), 57.

7. Sidney Drell and James Goodby, *What are Nuclear Weapons for? Recommendations for Restructuring U.S. Strategic Nuclear Forces* (Washington, DC: Arms Control Association, October 2007), 15.

8. Forsyth, Saltzman, and Schaub, "Minimum Deterrence and Its Critics," 6.

9. The Obama administration too has explicitly rejected minimum deterrence. See, Department of Defense (DOD), *Report on Nuclear Employment of the United States*, *US Code*, vol.10, sec. 491 of (Washington, DC: DOD, 12 June 2013), 4, http://www.globalsecurity.org/wmd/library/policy/dod/us-nuclear-employment-strategy.pdf.

10. See Keith B. Payne, *The Fallacies of Cold War Deterrence and a New Direction* (Lexington: University Press of Kentucky, 2001), chapters 1–4.

11. See for example, National Security Council, National Security Decision Memorandum 242, Policy for Planning the Employment of Nuclear Weapons, 17 January 1974 (declassified 29 June 2007); The White House, Presidential Directive NSC-59, Nuclear Weapons Employment Policy, 25 July 1980 (declassified 24 July 2012); and DOD, *Report on Nuclear Employment of the United States*.

12. See, Bruce G. Blair et al., *Toward True Security: Ten Steps the Next President Should Take to Transform U.S. Nuclear Weapons Policy* (Cambridge, MA: Federation of American Scientists, Natural Resources Defense Council, and Union of Concerned Scientists, February 2008), 17–18, http://www.ucsusa.org/assets/documents/nwgs/toward-true-security.pdf; Daryl Kimball and Matthew McKinzie, "Nuclear Dangers: Myth, Reality, Response," *Defense News*, 23 February 2015, http://www.defensenews.com/story/defense/commentary/2015/02/23/commentary-nuclear-dangers-myth-reality-responses/23885837/; and Walter Pincus, "Nuclear Weapons Modernization: Not Fast Enough for Kyl," *Washington Post*, 27 February 2014, https://www.washingtonpost.com/world/national-security/nuclear-weapons-modernization-not-fast-enough-for-kyl/2012/02/25/gIQANAJoeR_story.html.

13. A study by the Natural Resources Defense Council showed that a small "countervalue" strike with up to 192 weapons would inflict 54–56 million casualties in an exchange with Russia, while a very large "counterforce" strike—employing many times that number of weapons (approximately 1,300)—would inflict 11–17 million casualties. See Matthew McKinzie et al., *The U.S. Nuclear War Plan: A Time for a Change* (New York: National Resources Defense Council, June 2001), x and 125. Other studies find far fewer casualty levels from counterforce targeting scenarios and much higher possible casualty levels from intentional countervalue targeting. The distinction here involves literally scores of millions of potential casualties. See for example, Senate, *Briefing on Counterforce Attacks, Hearing before the Subcommittee on Arms Control, International Law, and Organization of the Committee on Foreign Relations,* 93rd Cong., 2nd sess., 11 September 1974, 12–22*;* Keir A. Lieber and Daryl G. Press, "The Nukes We Need: Preserving the American Deterrent," *Foreign Affairs* 88, no. 6 (November/December 2009): 47; and Office of Technology Assessment, *The Effects of Nuclear War* (Washington, DC: Congress of the United States, May 1979), 10.

14. See Payne, *Fallacies of Cold War Deterrence*; 1–77 and Keith B. Payne, *Deterrence and the Second Nuclear Age* (Lexington, University Press of Kentucky, 1996), especially chapters 2–4.

15. See, the testimony by Secretary of Defense Harold Brown in Senate, Nuclear War Strategy, Hearings before the Committee on Foreign Relations, 96th Cong., 2nd sess. (Top Secret hearing held on 16 September 1980; sanitized and printed on 18 February 1981), (Washington, DC: US Government Printing Office [GPO], 1981), 10. See also, Harold Brown in, *MX Missile Basing System and Related Issues, Hearing before the Committee on Armed Services*, 98th Cong., 1st sess., (Washington, DC: US GPO, 1983), 6–7.

16. See, the testimony by Secretary of Defense Harold Brown and the "Administration's Responses to Questions Submitted Before the Hearing," in ibid., 10, 16, 25, 29–30. See also, Office of Secretary of Defense, "Remarks Prepared for Delivery by the Honorable Harold Brown, Secretary of Defense, at the Convocation Ceremonies for the 97th Naval War College Class, Naval War College, Newport, Rhode Island, 20 August 1980;" and the discussion in Walter Slocombe, "The Countervailing Strategy," *International Security* 5, no. 4 (Spring 1981): 18–27.

17. For reasons explained in Keith B. Payne et al., *Minimum Deterrence: Examining the Evidence* (Fairfax, VA: National Institute Press, July 2013), 22–25, http://www.nipp.org/wp-content/uploads/2014/12/Final-Distro.pdf.

18. Remarks by Secretary McNamara at North Atlantic Treaty Organization (NATO) Ministerial Meeting, 5 May 1962, Restricted Session (Top Secret; declassified in part, 17 August 1979), 11–12, quoted in, Kurt Guthe, *Ten Continuities in U.S. Nuclear Weapons Policy, Strategy, Plans, and Forces* (Fairfax, VA: National Institute for Public Policy, September 2008), 50, http://www.nipp.org/wp-content/uploads/2014/11/N-Continuities-Draft_Rev-2.11.pdf.

19. *Memorandum from the Secretary of the Air Force (Brown) to Secretary of Defense McNamara*, 14 September 1967, in Office of the Historian, US Department of State, *Foreign Relations of the United States 1964–1968*, vol. 10, *National Security Policy*, Document 191, (Washington, DC: Department of State, n.d.) https://history.state.gov/historicaldocuments/frus1964-68v10/d191.

20. See for example, Senate, *The Honorable Harold Brown, before the US Senate Committee on Foreign Relations, The Department of Defense Statement on Strategic Military Balance: Military Assessment*, 96th Cong., 1st sess. (11 July 1979), 3.

21. For example, Hans M. Kristensen, "Questions about the Nuclear Cruise Missile Mission," *FAS Security Blog*, 25 March 2016, http://fas.org/blogs/security/2016/03/lrso-mission-questions/.

22. Henry Kissinger, "The Future of NATO," in, *NATO, The Next Thirty Years*, edited by Kenneth A. Myers (Boulder, CO: Westview Press, 1981), 8.

23. Robert Scher, Statement of Robert Scher, Assistant Secretary of Defense for Strategy, Plans, and Capabilities before the Senate Armed Services Subcommittee on Strategic Forces, 9 February 2016, 4, http://www.armed-services.senate.gov/imo/media/doc/Scher_02-09-16.pdf.

24. See Keith B. Payne et al., *Russian Strategy: Expansion, Crisis and Conflict* (Fairfax, VA: National Institute Press, 2016); and US–China Economic and Security Review Committee, *2015 Report to Congress* (Washington, DC: US GPO, November 2015), http://origin.www.uscc.gov/sites/default/files/annual_reports/2015%20Annual%20Report%20to%20Congress.PDF. See also, Bill Gertz, "China Adds Warheads to Older DF-5s," *Washington Times*, 10 February 2006, http://www.washingtontimes.com/news/2016/feb/10/inside-the-ring-china-adds-warhead-to-older-df-5s/.

25. See for example, Hans M. Kristensen and Robert S. Norris, "Reviewing Nuclear Guidance," *Arms Control Today*, 2 November 2011, http://www.armscontrol.org/act/2011_11/Reviewing_Nuclear_Guidance_Putting_Obama_Words_Into_Action; and Adam Mount, "The Fiscal Threat to Nuclear Strategy," *The Bulletin of the Atomic Scientists*, 15 March 2015, http://thebulletin.org/fiscal-threat-nuclear-strategy8080.

26. Kristensen and Norris, "Reviewing Nuclear Guidance;" and Tom Nichols, "Time to Change America's Atomic Arsenal," *The Diplomat* (Japan), 14 March 2013, http://thediplomat.com/2013/03/time-to-change-americas-atomic-arsenal/.

Busting Myths about Nuclear Deterrence

America is embarked on a quest for a world without nuclear weapons, but we live in a world not yet safe from war and threats of war. Hence, as long as nuclear weapons exist, the United States must maintain a safe, secure, and effective arsenal—both to deter potential adversaries and to assure US allies and other security partners that they can count on US security commitments. Our nuclear posture communicates to potential nuclear-armed adversaries that they cannot use nuclear threats to intimidate the United States, its allies, or partners or escalate their way out of failed conventional aggression. The United States Air Force (USAF) will continue to maintain its responsibilities as steward of two of the nation's three legs of the strategic nuclear triad and the nation's associated nuclear command, control, and communications infrastructure.

Since the Cold War, three states (India, Pakistan, and North Korea) have developed nuclear-weapon capabilities, while Iran remains on course to do so. Moreover, ongoing nuclear modernization programs in China and Russia point to the continued importance of nuclear deterrence and assurance for our allies and partners. Some countries now have military doctrines that include potential first use of nuclear weapons in a militarized crisis, and these countries regularly exercise those doctrines. These threats require the United States to seriously consider its responsibility to educate and advocate for the commitment and investment needed to sustain nuclear deterrence capabilities in a dangerous world.

The commitment must resemble Voltaire's *Candide*, dealing with the world as it is, rather than succumbing to the quest of Cervantes's *Don Quixote*, tilting fatefully at windmills. Currently, there are too many erroneous popular myths accepted uncritically by too many people about US nuclear capability. This commentary serves as a myth buster to elucidate these beliefs and confront them with the facts about America's nuclear arsenal and the purpose that arsenal serves.

Myth #1: The United States Does Not Use Nuclear Weapons

Although no nation has detonated a nuclear weapon in war since 9 August 1945, every US president since Harry Truman has used nuclear weapons to deter or compel adversaries by communicating the message

that the United States is fully capable of employing nuclear weapons under circumstances determined by the National Command Authorities. US Navy ballistic missile submarines (SSBN) and USAF intercontinental ballistic missiles (ICBM) are used 24/7 to deter any nuclear-armed country with hostile intentions against the United States. Moreover, USAF nuclear-capable bombers also have been used to convey national resolve to adversaries and allies.

This was the case with Pres. Barack Obama's decision to fly B-52 and B-2 bombers over the Korean peninsula in March 2013. North Korea had just completed its third nuclear weapons test and successfully launched a space-launch vehicle that clearly showed Kim Jung Un's intent to develop ballistic missiles capable of delivering a nuclear warhead against an Asian ally and possibly US territory. When the global news media noticed a B-2 over Seoul, one international news agency did not report that the bat-winged, radar-evading aircraft had flown a regularly scheduled peacetime exercise. Instead, the outlet stated that the "United States flew two nuclear-capable stealth bombers on practice runs over South Korea . . . in a rare show of force following a series of North Korean threats that the Pentagon said have set Pyongyang on a dangerous path."[1] Chinese, North and South Korean, Russian, European, and US news outlets likewise focused almost exclusively on the nuclear capability of the bombers used in this mission.

Any nuclear-armed state contemplating aggression against the United States recognizes the overwhelming odds against its success and the jeopardy it faces for foolhardy acts. Silo-based ICBMs deployed across America's heartland, SSBNs patrolling beneath the world's oceans, and our nuclear-capable bombers are constant, tangible reminders of the price for nuclear aggression against the United States. *Myth #1 Busted—The fact is the United States uses its nuclear weapons every day.*

Myth #2: Nuclear Weapons Have Only Limited Utility for Their Cost

The USAF spends about $5 billion a year to maintain ICBMs and bombers to deter nuclear attacks against the United States, and the service is committed to a 10-year, $83.9 billion strategic modernization plan for its portion of the nation's nuclear deterrent. The Congressional Budget Office reports that the federal government will spend $355 bil-

lion over the next 10 years for all nuclear weapons investments, including those of the USAF, the Navy, the Department of Defense (DOD), and the Department of Energy.[2] These actual and projected expenditures are by no means insignificant, yet the cost of a weapon system is meaningful only in relation to the capability it provides and the broader purpose it serves. Stated differently, one must measure the merits of a weapon beyond just its monetary cost relative to the threat it confronts.

By deterring the only existential threat that can destroy the United States, nuclear weapons are a bargain. This does not diminish the warfighting capability of conventional forces, but history has shown repeatedly that conventional weapons are not an effective deterrent against major interstate war, and certainly would not be in a nuclear-armed world. In the past, civilian and military leaders often failed to anticipate the costly consequences of war. One need only consider the millions killed in the two world wars of the twentieth century to conclude that conventional forces alone do not deter national leaders determined to undertake large-scale aggression.

Yet, foreign leaders today could hardly fail to grasp the consequences of such aggression against the United States. Carl von Clausewitz observed in his classic work, *On War*, that when the potential exists for extreme violence, states should not take the first step toward war without carefully considering the last step. Because the US nuclear arsenal clarifies and sharpens nuclear-armed adversaries' thinking about war in ways other weapons cannot, those states are wary of taking the first step—because they readily grasp the image of the last step. Nuclear deterrence is thus a bargain against extreme forms of aggression. *Myth #2 Busted—Nuclear weapons are a priceless deterrent until nuclear weapons are verifiably eliminated from all countries' arsenals.*

Myth #3: Nuclear Weapons Are Going Away

Why bother spending billions of dollars to modernize US nuclear forces? Faith in the eventuality of a world devoid of nuclear weapons is the clarion call of the arms control community for radically reduced spending on nuclear weapons.[3] The hope for nuclear disarmament has inspired many US presidents, most recently President Obama, but the twenty-first century presents an incontestable reality of nuclear-armed states, most notably China and Russia.[4] The Congressional Commission

on the Strategic Posture of the United States acknowledged this reality: "The conditions that might make possible the global elimination of nuclear weapons are not present today and their creation would require a fundamental transformation of the world political order."[5]

The commission observed—with specific reference to uncertainty about China and Russia—that "the U.S. nuclear posture must be designed . . . not just [for] deterrence of enemies in time of crisis and war but also assurance of our allies and dissuasion of potential adversaries. . . . The triad of strategic nuclear delivery systems should be maintained for the immediate future and this will require some difficult investment choices."[6] In 2014, nearly five years after the commission's final report was released, the commander of US Strategic Command affirmed that foreign "nuclear powers are investing in long-term and wide-ranging military modernization programs."[7] Notable among these programs are China's and Russia's growing nuclear capabilities.

China's once modest nuclear force is rapidly evolving in size and in quality. "Over the next three to five years, China's nuclear program will become more lethal and survivable with the fielding of additional road-mobile nuclear missiles; five nuclear-powered ballistic missile submarines, each carrying 12 sea-launched intercontinental-range ballistic missiles; and ICBMs armed with multiple independently targetable re-entry vehicles."[8] In late 2014 Beijing tested its first ICBM capable of carrying up to 10 warheads, a development that has been characterized as "a significant advance for China's strategic nuclear forces and part of a build-up that is likely to affect the strategic balance of forces."[9] Even the less-favored air-breathing leg of China's nuclear arsenal will benefit from the addition of the new H-6K bomber, which is equipped with long-range, nuclear-capable Changjian-10 cruise missiles, effectively increasing the aircraft's combat radius to reach Okinawa, Guam, and Hawaii from the mainland.[10] Russia also continues a robust nuclear modernization program that includes silo-based and mobile versions of the RS-24 and mobile RS-26 ICBMs, both carrying multiple independently targetable reentry vehicles; deployment of up to eight new Borei-class SSBNs, fitted with 16 launch tubes for new Bulava ICBMs (each carrying up to 10 independently targetable warheads); and development of a new long-range bomber to be outfitted with hypersonic missiles.[11] Given the reality of nuclear-armed states and nuclear-weapon aspirants, the United States must make the difficult choices to sustain our nuclear deterrent. *Myth*

#3 Busted—Nuclear weapons are not going away; rather nuclear states are modernizing their arsenals, while other states seek these weapons.

Myth #4: The United States Can Deter with Submarines Alone

This myth is predicated primarily on the notion SSBN survivability is "easier to achieve" relative to fixed-site ICBMs and long-range bombers that may be vulnerable on the ground and in the air.[12] However, there are two risks with the submarine-only deterrent myth. First, while some argue the stealth of SSBNs ensures their survival for second-strike missions, the current US chief of naval operations has noted the limits of stealth-based platforms. Adm Jonathan W. Greenert has observed that the "rapid expansion of computing power also ushers in new sensors and methods that will make stealth and its advantages increasingly difficult to maintain above and below the water."[13] While adversaries probably could not achieve antisubmarine warfare (ASW) breakthroughs in the near term to threaten SSBNs, by divesting itself of the deterrent triad for a SSBN-based monad, the United States would necessarily create a high payoff incentive for adversaries to seek ASW capabilities to neutralize US ballistic missile submarines. Rather than saving defense resources by scrapping ICBM and bomber forces, a new and potentially destabilizing arms race could occur as each side postures and repostures below the world's oceans.

The second risk of a submarine-only nuclear force is that the United States would have no way to demonstrate intent to nuclear-armed regional adversaries or to allies who rely on US extended deterrence to preserve peace. Locational uncertainty is necessary for SSBNs to preserve their second-strike capability; thus, submariners are highly averse to revealing their position. This vulnerability surrenders their primary method for survivability.[14] However, being visible is exactly what is needed to demonstrate resolve—thus, the reason nuclear-capable bombers are so important. Ballistic missile submarines simply could not do what the B-2 bombers did over Korea in 2013. As the Commission on the Strategic Posture of the United States observed, "each leg of the triad has its own value."[15] The commission further pointed out that the unique and synergistic characteristics of the triad will remain "valuable as the number of operationally deployed strategic nuclear weapons" de-

clines.[16] *Myth #4 Busted—The United States cannot safely deter nuclear aggression with a SSBN-based monad alone.*

Myth #5: The USAF Is Stuck in a Cold War Mind-Set

Although the United States took an intellectual holiday from thinking about nuclear deterrence following the Cold War, the USAF has undertaken a fundamental transformation of its approach to thinking about nuclear weapons in the twenty-first century.[17] Secretary of the Air Force Deborah James has noted the diminished understanding of deterrence across the nuclear enterprise and within the USAF, even among senior leaders, and she has made a forceful call for USAF professionals to reestablish their intellectual leadership on deterrence. In addition to dozens of immediate actions under its Force Improvement Programs, the USAF is undertaking longer-range reform of its doctrine, professional military education (PME) for all Airmen, and continuing education of its nuclear professionals.

Established by the Nuclear Oversight Board, a governing body of USAF senior executives chaired by the secretary and chief of staff, the Air Force Nuclear Enterprise Flight Plan guides these initiatives. This publicly available document articulates the USAF's foundational understanding of the nature of deterrence and Airmen's role in providing the nation with nuclear deterrence capabilities.[18]

The USAF Chief of Staff, Gen Mark Welsh, has instituted a quarterly deterrence seminar for Air Staff principals. He leads this tabletop exercise, employing staff and outside expertise to consider various plausible near-future scenarios and debating contending solutions. USAF senior executives take this seriously, and their debates are frank, open, and sometimes contentious.

The curriculum of all USAF PME institutions is under vigorous review; new content and courses on twenty-first century nuclear deterrence are being introduced at every level. The Air Force Academy will soon offer several new courses supporting a new nuclear weapons and strategy minor for undergraduates. For all general officers and senior executives (even the chief of chaplains) there is now a senior leader course, "Nuclear 400," that engages participants in problem solving case studies of real-world deterrence operations and nuclear enterprise management challenges. Nuclear professionals are required to complete weeklong continuing education courses to refresh and renew their expertise.

The Air Force LeMay Doctrine Center is bringing together nuclear deterrence professionals from all across the USAF to make a fundamental transformation of the nuclear deterrence operations annex to Air Force doctrine and to revise the treatment of deterrence across all elements of Air Force basic doctrine. In November 2014 the Air Force Studies Board of the National Academies concluded a two-year effort to develop a comprehensive plan for developing new methods, approaches, and tools for analyzing twenty-first century deterrence.[19] General Welsh directed the board's recommendations be implemented to enable USAF senior leaders to exert renewed intellectual leadership on deterrence.

America's Airmen know deterrence and are ready to articulate twenty-first century deterrence capabilities. The USAF has undertaken several activities and initiatives to reverse the lack of attention and interest that beset much of the DOD after the Cold War.[20] Moreover, the USAF will sustain its commitment and effort to deter extant and emerging nuclear threats in a post–Cold War world. *Myth #5 Busted—The USAF is not stuck in a Cold War mind-set—far from it.*

Conclusion

Although the United States is committed to the goal of a nuclear-weapon-free world, as long as nuclear weapons exist in foreign arsenals, there is simply no alternative path for the United States than to maintain safe, secure, and effective nuclear capabilities. As a visible signal of our intent to act if circumstances warrant, the US bomber force remains crucial for extended deterrence of threats against allies and other partners during times of crisis. ICBMs, widely dispersed around three Air Force bases, are key for deterrence of attack against the United States, because for the foreseeable future no aggressor has any prospect of disarming our land-based missile force. Ballistic missile submarines patrol securely beneath the world's oceans, ensuring a secure second-strike capability even under the direst circumstances. With the commitment of resources, the unique attributes of each leg of the triad will continue to complicate adversaries' offensive and defensive planning and contribute to America's security.

Nuclear weapons played an essential role in preventing superpower war during the Cold War. Although the potential for major state-on-state war today may be lower, it is not absent and may indeed grow; therefore, USAF nuclear capabilities, as part of the US nuclear arsenal,

continue to provide essential contributions to preserve the peace. Difficult decisions lay ahead, as the United States thinks about nuclear forces and nuclear deterrence. However, focusing on facts and applying sound reasoning can make the choices clearer. SSQ

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The Need for a Strong US Nuclear Deterrent in the Twenty-First Century

Nuclear weapons will continue to have a significant influence on international security for the foreseeable future. Their elimination has not been seriously considered in any of the nuclear weapons states except the United States and the United Kingdom. France, Russia, China, India, Pakistan, and North Korea have shown no such inclination. Indeed, Russia, China, India, and Pakistan are all embarked on major nuclear weapons modernization programs. In such a world, the United States will continue to need a viable and effective deterrent to prevent nuclear attack or nuclear blackmail against ourselves or our allies. The key questions are: What constitutes a credible deterrent and how much is enough?

While the United States has deferred nuclear weapons modernization, other nations are moving forward. Among the so-called P-5 nuclear weapons states, Russia is deploying a new generation of intercontinental ballistic missiles (ICBM) and is contemplating building a second new type—a giant Cold War throwback in the "heavy" ICBM class. It is also deploying two new types of submarine-launched ballistic missiles (SLBM) and a new class of strategic ballistic-missile submarines (SSBN). China is deploying two new types of ICBMs, developing a new SLBM, and building a new class of SSBNs. It is the only one of the P-5 nuclear weapons states which continues to increase the size of its nuclear missile force. France is completing a long-standing modernization of its SLBM force. Since 2009, India and Pakistan have accelerated their subcontinental nuclear arms race, and both countries are building and testing longer-range land-based missiles. India is moving rapidly toward deployment of an SSBN and achieving a strategic triad, while Pakistan is doubling its fissile material production capability and has deployed a new generation of tactical nuclear weapons. North Korea continues its attempt to develop ICBM-class missiles. In contrast to all of this, the United Kingdom has postponed, until after the next parliamentary elections in 2015, a final decision to replace its aging SSBNs with new ships (although preliminary design work is proceeding). The United States has deferred any major efforts to modernize the three legs of its nuclear triad or its nuclear weapons infrastructure.

It should be clear that the often-repeated aspirational statement made by the nuclear disarmament and nonproliferation lobbies—that the

United States and United Kingdom could "lead by example" by reducing their nuclear arsenals and other nuclear powers will follow suit—is demonstrably false. In fact, during the past 20 years (a period of dramatic nuclear reductions by the United States and Russia and significant reductions by the United Kingdom and France), Indian and Pakistani nuclear arsenals have continued to grow, North Korea has become a nuclear weapons state, Syria began a clandestine nuclear weapons program, and Iran is on the verge of beginning such a program.

While the US and UK administrations have been reducing the role of nuclear weapons in their respective national strategies, the Russian government has placed them at the very heart of its national security strategy. Additionally, the Kremlin publicly threatened to use nuclear weapons against Russia's neighbors over the past three to four years, including an exercise in the fall of 2009 which simulated nuclear attacks against Poland. It authorized Russian strategic bombers to repeatedly undertake highly provocative flights near and into UK, US, and other NATO airspace and published a "military doctrine" which named NATO as a military threat and suggested preemptive strikes against NATO ballistic missile defense (BMD) sites.

Consequently, in a world where nuclear-armed states use their nuclear weapons for coercion and intimidation, the United States must maintain a capable, secure, and credible nuclear deterrent.

Elements of a Capable, Secure, and Credible Deterrent

Academic literature often suggests that deterrence can be accomplished in two ways: "deterrence by denial" or "deterrence by punishment." This distinction misunderstands the reality of the nuclear deterrent. *Deterrence by denial* suggests that an effective defense can blunt an aggressor's attack, causing it to recognize eventually that the planned aggression will not succeed. By extension, this suggests that a superb conventional defense, augmented by a highly effective missile defense, is a substitute for nuclear deterrence and that such a conventional deterrent alone is sufficient to prevent aggression, even against an aggressor armed with weapons of mass destruction (WMD).*

*To be clear, ballistic missile defenses play a key role in US and allied security by complicating an aggressor's risk calculus, successfully defending against small-scale attacks, and by limiting damage should an attack occur. The point here is that such defenses are a complement to, not a substitute for, nuclear deterrence.

But this plays into the fallacy of a stand-alone conventional deterrent—a determined enemy will work to negate the conventional defenses and missile defenses and, having done so, can then attack. What distinguishes nuclear deterrence is the inevitability of a devastating response, even if the victim is about to be defeated on the battlefield.

An effective nuclear deterrent consists of five key pillars:

1. A clear determination of what the deterrent is designed to prevent (an attack on a country's homeland, an ally's homeland, or on other critical assets, such as reconnaissance systems?);
2. An understanding of what constitutes the potential aggressor's vital assets which loss through nuclear retaliation would negate any benefits that aggression might hope to achieve;
3. A deterrent force structure manifestly capable of delivering a devastating attack against the aggressor's most valued assets;
4. A deterrent force structure which cannot be destroyed or fatally weakened by a preemptive attack; and
5. A declaratory policy which is credible in the mind of the potential aggressor's leadership and creates no doubt that certain forms of aggression *will* draw a nuclear response.

What is its Purpose?

For the most part, national nuclear deterrents in the twenty-first century are intended to deter either direct conventional or nuclear attack on the possessor's homeland or to prevent nuclear blackmail. The policy of the United States makes clear our nuclear weapons serve not only to deter attack on our homeland, but to protect our allies' security as well. The United States has "extended" its deterrent to cover NATO, Japan, the Republic of Korea, and Australia. This places additional demands on our force structure and strategic flexibility.

What does the Adversary Leadership Value?

Understanding what a potential adversary's leadership values is fundamental to having a credible deterrent policy. Democracies are fairly transparent, and it is relatively easy for a potential aggressor to determine what types of nuclear threats might be used to intimidate freely elected governments. Deterring authoritarian states, however, is more

difficult. Authoritarian regimes usually do not share the same values as democracies. They tend to focus on preserving the mechanisms used to control their society and ways to maintain those societies even in time of war. The worst mistake US policymakers can commit in this regard is to "mirror image"—that is, to impute their own value structure to a potential enemy's leadership.

Manifest Capability

A deterrent force must be seen as capable by potential adversaries. While it is important that a possessor government be confident its deterrent can carry out its intended mission, even in extremis, this is a necessary but insufficient condition of deterrence. The potential aggressor must recognize this as well. This requires conducting sufficient exercises, including test-firings where appropriate, to ensure that technical capability, as well as operational proficiency, is widely perceived as equal to the task. Former Defense Secretary Robert McNamara (who, while serving in office, strongly supported nuclear deterrence but later recanted his views and obfuscated his government record) probably summed this up best when he told the US Senate Armed Services Committee in 1963, "any force that has such characteristics that it cannot be thought of as an operating force cannot serve as a deterrent, and therefore, unless one has a force that has capabilities for actual operations and a force for which one has an operational plan, one, in my opinion, does not have a credible deterrent."

Survivability

A nuclear force which an enemy can destroy preemptively is a target and an invitation to surprise attack, not a deterrent. A true deterrent must have at least one force element capable of surviving a preemptive attack and retaliating effectively. In today's world, the safest means of achieving this is to deploy a portion of the force—or in some nations, the entire force—on submarines, at least one of which is continuously at sea. Having multiple types of deterrent forces increases the overall survivability of a deterrent.

A Credible Declaratory Policy

A credible policy is one which ties the protection afforded by the nuclear deterrent to a believable set of objectives in the eyes of one's

own people, allies, and potential enemies. Nuclear weapons are not, and never were intended to be, all-purpose deterrents. It would not be credible, for example, to threaten nuclear retaliation in response to a proxy guerilla war in some foreign territory, a lamentable but small-scale conventional attack on one's own forces, or even the loss of one or several orbiting satellites. Recall, for example, the North Korean seizure of the USS *Pueblo* or the Iraqi attack on the USS *Stark*. Nuclear responses are credible when linked directly to the defense of a nation's vital interests and territorial integrity and, where undergirded by treaties and decades of demonstrated commitment, to the defense of allies' vital interests and territorial integrity. A potential adversary who believes that a deterrent has been linked to the defense of something which is not worth risking national survival through the military employment of nuclear weapons is likely to test that proposition.

The Nuclear Triad: A Deterrent Force Which Has Stood the Test of Time

The US nuclear triad of land-based ICBMs, submarine-based ballistic missiles, and heavy bombers is a deterrent force which for decades has provided a survivable and manifestly capable deterrent. While its birth was unintentional (the product of interservice rivalry), the triad has shown, in its combination of basing modes, delivery systems, and warhead types, an overall capability which ensures that no enemy attack could prevent effective US retaliation. In essence, the triad has been modernized twice—in the early 1960s by the Kennedy administration and in the 1980s by the Reagan administration. As discussed below, each of the systems will require significant modernization or replacement in the next two decades.

ICBMs

The very first Minuteman I was deployed in 1963. The current system, the Minuteman III, was first deployed in 1970. Currently 450 Minuteman IIIs are deployed at three ICBM bases: F. E. Warren (Wyoming), Minot (North Dakota), and Malmstrom (Montana). The Minuteman III has received several generations of sustainment and modernization, most recently focusing on propulsion replacement, guidance replacement, and Mk21 fuse refurbishment. These last three are designed to

support Minuteman III service life through 2030. The Air Force has embarked on a process to determine future ICBM needs; this will support the decision for the MM III SLEP (service life extension program) or new ICBM development in the 2015 time frame.

SLBMs

Trident D5 SLBMs are carried aboard 14 *Ohio*-class SSBNs, 12 of which are operational with about half the force at sea on any given day. Currently, 241 Trident D5 SLBMs are deployed. Each missile is estimated to carry four warheads—either the W76 or the larger, more modern W88. There is a life extension program (LEP) for the W-76 which is slated to be completed by 2018; approximately 1,200 warheads are expected to be refurbished. The Trident D5 SLBM also is undergoing an LEP that will modernize guidance systems and missile electronics and build additional D5 missiles. The *Ohio*-class submarines are undergoing cycles of refurbishment and modernization to maintain them for several more decades. As currently envisioned, they will be replaced by 12 new *Ohio* replacement program (ORP) submarines with 16 launch tubes each. The first of the new submarines was originally slated to go into service in 2029, and the last of the original *Ohio*-class submarines is to be retired by 2040. The FY-2013 budget delayed delivery of the first new SSBN by two years. This will cause the number of operational SSBNs to fall to 10 in the 2030s.

Bombers

The United States has two bombers assigned to nuclear missions—the B-2 stealth bomber and the venerable B-52H, the most "modern" of which was built in 1962. The B-2s, first deployed in 1997, carry nuclear gravity bombs. B-52s carry the AGM-86B air-launched cruise missiles first deployed in 1980. The 2010 *Nuclear Posture Review* stated that a study was seeking alternatives for a new long-range bomber. More-recent statements by the Air Force leadership state the plane will have a nuclear mission but probably not when it initially becomes operational. The Air Force has begun a program to procure a new long-range stand-off (LRSO) weapon to replace the AGM-86B, but it is not yet clear whether the program, as structured, will be affordable.

How Much is Enough?

One of the classic questions confronting defense analysts and military planners is how large a nuclear stockpile is required to be an effective deterrent. The discussion frequently focuses on a false dichotomy of what is needed to hold at risk so-called war-fighting or counterforce targets (e.g., military forces, leadership sites, and war-supporting industry) versus what is required to hold at risk countervalue targets (e.g., cities). Some even believe, mistakenly, that US policy in the 1960s was countervalue-oriented. The simple fact is that deterrence is highly complex and rests on convincing any potential aggressor that the devastation created by our retaliation would far outweigh the benefits of any aggression, so that attacking us or our allies becomes unthinkable. This means, as noted above, that an effective deterrent requires holding at risk that which a potential enemy's leadership values most. Given the world in which we live, US deterrence requirements are driven primarily by the need to deter a future Russian leadership, should it develop hostile intent, and secondarily, by the need to deter a future Chinese leadership in the same circumstances. While other deterrence requirements exist, they can be treated as lesser included cases from a force structure and force sizing standpoint.

The recently retired commander of US Strategic Command, Gen Kevin Chilton, USAF, testified to Congress in 2010 that he was "comfortable with the force structure that we have" provided by the New START treaty, as it is "adequate for the mission that we've been given, and is consistent with NPR." That means a force of about 1,550 *deployed* strategic nuclear weapons, which translates into about 2,200–2,500 actual weapons due to the treaty's "counting rules." While some additional reductions may be justified by future positive international developments, it should be clear that radically deep reductions to only a few hundred weapons would be wholly inadequate. Such a small force would fail almost all of the requirements of a capable, secure, and credible deterrent discussed above for two reasons: First, it would not deter a direct attack on the United States, let alone threats to and blackmail of our allies, because it would be too small to threaten retaliation against the most valued assets of a Russia or China gone bad; and second, it would be too small to be survivably based and most likely would have to be deployed in a single basing mode rather than a triad. Put another way, it would be susceptible to an enemy preemptive first strike.

Conclusion

In the 300 years following the Treaty of Westphalia in 1648 and the emergence of the modern nation-state, the great powers of Europe went to war with one another an average of seven times per century. Even the horrific carnage of World War I, "the war to end all wars," which resulted in 15 million dead and 20 million wounded and decimated a generation of European males, was insufficient to prevent World War II. But after 1945, the great powers in Europe, and elsewhere around the world, have not engaged in direct military conflict with one another.

Human nature has not changed; witness the atrocities committed in the "civilized and modern" Yugoslavia once that country imploded into civil war or the unspeakable crimes committed by terrorists over the last decade. But something else did change: nuclear weapons have made war among the great powers too dangerous. As a result, they have moderated the behavior of the great powers toward one another. But this stability is fragile.

If the United States were to reduce its nuclear deterrent to a point where it could not be extended to its allies—or even to a point where it was perceived to be unable to threaten the vital interests of potential enemy leaderships—we could see a return to the dangers of the "nuclear-free world" which preceded 1945. On the other hand, a strong and modernized deterrent will allow this nation to continue to maintain the peace and to provide for our own and our allies' security. We must not fail to ensure the peace. We must maintain a modern nuclear deterrent. SSQ

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The New Era of Nuclear Weapons, Deterrence, and Conflict

We have published a series of articles in recent years about the role of nuclear weapons in international politics.[1] Taken together, these articles advance two main arguments: First, technological innovation has dramatically improved the ability of states to launch "counterforce" attacks—that is, military strikes aimed at disarming an adversary by destroying its nuclear weapons. Second, in the coming decades, deterring the use of nuclear weapons during conventional wars will be much harder than most analysts believe. Both of these arguments have important implications for the US nuclear weapons modernization effort currently underway, and both have generated discussion and criticism in the nuclear analytical community. Thus, we offer here a brief summary of our main points and rebuttal to several of the criticisms.

The Counterforce Revolution and US Nuclear Primacy

The first set of arguments is about an important, yet virtually unnoticed, consequence of changes in military technology and the balance of power. In a nutshell, the same revolution in accuracy that has transformed *conventional* warfare has had equally momentous consequences for *nuclear* weapons and deterrence.[2] Very accurate delivery systems, new reconnaissance technologies, and the downsizing of arsenals from Cold War levels have made both conventional and nuclear counterforce strikes against nuclear arsenals much more feasible than ever before. Perhaps most surprising, pairing highly accurate delivery systems with nuclear weapons permits target strategies that would create virtually no radioactive fallout, hence, vastly reduced fatalities.

For nuclear analysts weaned on two seeming truths of the Cold War era—that nuclear arsenals reliably deter attacks via the threat of retaliation, and that nuclear weapons use is tantamount to mass slaughter—the implications of the counterforce revolution should be jarring.

The conventional view linking nuclear weapons to stalemate and slaughter was correct during the latter decades of the Cold War. By the mid 1960s, a truly effective nuclear counterforce strike by either side—that is, a disarming blow by one superpower against the nuclear arsenal

of the other—had become impossible.[3] Each of the superpowers wielded an enormous arsenal, which was deployed on a diverse set of delivery systems. The sheer number of targets that would have to be destroyed, combined with the limitations of contemporary guidance systems, virtually guaranteed that any disarming attack would fail, leaving the enemy with a large number of surviving weapons with which to retaliate. Furthermore, any significant counterforce strike would have produced enormous quantities of lethal radioactive fallout and hence caused millions of civilian casualties.[4] Most Cold War strategists—many of whom are still active in the nuclear analytical community today—came to instinctively associate nuclear weapons with stalemate and nuclear use with Armageddon.

But nuclear weapons—like virtually all other weapons—have changed dramatically over the past four decades. Modern guidance systems permit nuclear planners to achieve "probabilities of damage" against hardened nuclear targets that were unheard of during the Cold War. And heightened accuracy also permits nontraditional targeting strategies that would further increase the effectiveness of counterforce strikes and greatly reduce casualties.[5] The revolution in accuracy and sensors, and the relatively small contemporary arsenals, mean that nuclear balances around the world—for example, between the United States and China, the United States and North Korea, and perhaps in the future between Iran and Israel—bear little resemblance to the Cold War superpower standoff.

To illustrate the revolution in accuracy, in 2006 we modeled the hardest case for our claim: a hypothetical US first strike on the next largest nuclear arsenal in the world, that of Russia. The same models that were used during the Cold War to demonstrate the inescapability of stalemate—the condition of "mutual assured destruction," or MAD—now suggested that even the large Russian arsenal could be destroyed in a disarming strike.[6] Furthermore, the dramatic leap in accuracy—which is the foundation for effective counterforce—is based on widely available technologies within reach of other nuclear-armed states, including Russia, China, Pakistan, and others. Our overriding message is not about the US-Russian nuclear balance per se. Rather, our point is that key beliefs about nuclear weapons have been overturned; scholars and analysts need to reexamine their underlying assumptions about nuclear stalemate and deterrence.

Since 2006, we have discussed these issues with many nuclear analysts, US government officials, and military officers involved with the nuclear mission. Almost everything we learned reinforced our views about the

counterforce revolution and suggests our earlier work *understated* the leap in US counterforce capabilities—with one exception. We previously argued that US "nuclear primacy"—the ability to use nuclear weapons to destroy the strategic forces of any other country—appeared to be an intentional goal of US policymakers. We noted that even as the United States greatly reduced its nuclear arsenal, it retained, and in some cases improved, those nuclear forces that were ideally suited to the counterforce mission. Based on what we have subsequently learned, we would recast and sharpen this part of our argument to contend that the United States is intentionally pursuing "*strategic* primacy"—meaning that Washington seeks the ability to defeat enemy nuclear forces (as well as other WMD)—but that US nuclear weapons are but one dimension of that effort. In fact, the effort to neutralize adversary strategic forces—that is, achieve strategic primacy—spans nearly every realm of warfare: for example, ballistic missile defense, antisubmarine warfare, intelligence-surveillance-and-reconnaissance systems, offensive cyber warfare, conventional precision strike, and long-range precision strike, in addition to nuclear strike capabilities.

In sum, two fundamental "truths" about nuclear weapons—they reliably produce stalemate and their use would necessarily create mass casualties—have been quietly overturned by changes in technology and dramatic force reductions. Unfortunately, many contemporary analyses of nuclear politics seem to rest on the assumption that nuclear deterrence still functions as it did in the 1970s. The stipulation of mass slaughter under MAD conditions may be true for some nuclear relationships in the world but not for others. And new conditions generate new questions: for example, how is deterrence likely to work when nuclear use does not automatically imply suicide and mass slaughter? In particular, what are the implications for US nuclear policy?

The Problem of Coercive Escalation and US Nuclear Modernization

A second set of arguments stems from the problem of nuclear escalation and the future of the US nuclear arsenal. Our main claim is that deterring nuclear conflict will be much more difficult in the coming decades than many analysts realize. As nuclear weapons proliferate, it becomes increasingly likely that the United States will find itself in conventional

conflicts with nuclear-armed adversaries. Those adversaries understand the consequences of losing a war to the United States—prison or death typically awaits enemy leaders.[7] Coercive nuclear escalation as a means of creating stalemate and remaining in power is one of the only trump cards available to countries fighting the United States.

Some analysts might scoff at the notion that a rational leader would use nuclear weapons against a superpower like the United States. But that retort conflates the logic of peacetime deterrence with the logic of war, and it ignores history. During peacetime, almost any course of action is better than starting a nuclear war against a superpower. But during war—when that superpower's planes are bombing command and leadership sites, and when its tanks are seizing territory—the greatest danger may be to refrain from escalation and let the war run its course. Leaders of weaker states—those unlikely to prevail on the conventional battlefield—face life-and-death pressures to compel a stalemate. And nuclear weapons provide a better means of coercive escalation than virtually any other.

The notion of countries escalating conflict to avoid conventional defeat may sound far-fetched, but it is well grounded in history. When nuclear-armed states face overwhelming conventional threats—or worry about the possibility of catastrophic conventional defeat—they often adopt coercive escalatory doctrines to deter war or stalemate a conflict that erupts. Pakistan openly intends to use nuclear weapons to counter an overwhelming conventional Indian invasion. Russia claims it needs theater nuclear weapons to counter NATO's conventional advantages. Israel expects to win its conventional wars but retains the capability for nuclear escalation to prevent conquest in case its conventional forces suffer a catastrophic defeat.

The discussion of coercive nuclear escalation should sound familiar to Western analysts, as it was NATO's strategy for three decades. From the mid 1960s until the end of the Cold War, NATO planned to deter war, and stalemate it if necessary, through coercive nuclear escalation. NATO understood that—by the mid 1960s—it could no longer win a nuclear war against the Soviet Union, but it still based its national security strategy on coercive escalation because it believed Warsaw Pact conventional forces were overwhelming.

In short, the escalatory dynamics that existed during the Cold War exist today—and they are just as powerful. States still face the same critical

national security problem they faced during the Cold War and throughout history: namely, how to prevent stronger countries from conquering them. The high-stakes poker game of international politics has not ended; the players and the cards dealt have merely changed. Those who were weak during the Cold War are now strong, and another set of militarily "weak" countries—such as North Korea, Iran, Pakistan, and even China and Russia—now clutch or seek nuclear weapons to defend themselves from overwhelming military might, just as NATO once did.

What can the United States do to mitigate the problem of escalation? Ideally, it should avoid wars against nuclear-armed enemies. But that option may not be possible given current US foreign policy and alliances. War may erupt on the Korean Peninsula, ensnaring the United States in a battle against a desperate nuclear-armed foe. In the future, Washington may fight a nuclear-armed Iran over sea lanes in the Persian Gulf. And the United States could someday be dragged into war by a clash between Chinese and Japanese naval forces near disputed islands.

Alternatively, the United States could seek to develop conventional war plans designed to wage limited war without triggering enemy escalation. Development of alternative plans is sensible, but history shows that wars are difficult to contain, and modern conventional warfare is inherently escalatory.

A third option to mitigate these dangers is to retain, and improve, US nuclear and nonnuclear counterforce capabilities. Fielding powerful counterforce weapons may help deter adversary escalation during war—by convincing enemy leaders to choose a "golden parachute" rather than escalation—and would give US leaders better response options if deterrence failed. In particular, the United States should retain and develop nuclear weapons that bring together three key characteristics of counterforce: high accuracy, flexible yield, and prompt delivery.

To be clear, sharpening US counterforce capabilities is not a "solution" to the problem of adversary nuclear weapons. Although, ceteris paribus, it would be better to have excellent counterforce capabilities than to lack them, given enough time and motivation, many countries could greatly increase the survivability of their forces. But given the plausible prospect that the United States will find itself waging war against nuclear-armed states, and given the powerful incentives of US adversaries to brandish or use nuclear weapons, it would be reckless to proceed without a full suite of modern nuclear and nonnuclear counterforce capabilities.

Response to Our Critics

A recent conference panel devoted to our work raised several criticisms, some familiar and others new.[8] Below we summarize the main objections and offer our response.

"The United States is not seeking to neutralize adversary deterrent forces."

Some critics argue that the United States is not seeking strategic primacy. They reject any intent behind the emergence of US nuclear primacy and downplay the effort to neutralize adversary deterrent forces in US military strategy. Instead of the United States bolstering its counterforce capabilities, critics emphasize how it is minimizing the role of nuclear weapons in national security strategy—as only this is consistent with international arms control and nonproliferation efforts aimed at convincing other states to forego strategic weapons, reduce existing arsenals, or cancel modernization programs. The implication is that we have mistakenly imputed sinister motives to US defense programs and planning.

Disavowal of the US pursuit of strategic primacy comes most frequently from those who work inside or outside the government on arms control and nonproliferation policy. Yet, those who work on US regional war plans and counterproliferation policy typically see nothing controversial in our claim that the United States seeks the ability to neutralize adversary strategic weapons. In fact, this effort appears to be official US policy. As a simple Internet search shows, the US government does not hide the wide range of research and planning efforts underway that fall under the rubric of "defeat WMD" or "combatting WMD." And the underlying logic behind those efforts is simple: deterrence may fail, especially during conventional wars, and therefore the United States needs the ability to defend US forces, allies, and the US homeland from enemy WMD using, depending on the circumstances, conventional strikes, missile defenses, special operations, offensive cyber attacks, and in extreme cases nuclear strikes. In short, "defeating WMD" and "seeking strategic primacy" are essentially synonymous: protecting oneself from others' strategic weapons (which sounds reasonable) and neutralizing others' strategic deterrent forces (which sounds more malicious) are simply two phrases describing the same behavior.

Current US grand strategy—which takes an expansive definition of national interests and is committed to a global network of alliances—

means that the United States may be drawn into wars with WMD-armed adversaries. We agree with many US government officials that the ability to neutralize those adversary capabilities in such a conflict may be critical. Others are free to disagree. But all analysts should recognize that current US efforts to neutralize adversaries' deterrent forces are inherently threatening to those states, and few should be surprised when those adversaries treat US pleas for greater arms reductions with considerable skepticism.[9]

"Nuclear weapons are unnecessary; conventional weapons can do the job."

A second criticism is that retaining (or improving) specific US nuclear weapons for the counterforce mission is unnecessary. The idea is that modern delivery systems are now so accurate that even conventional weapons can reliably destroy hardened targets. The key, according to this argument, is simply knowing the location of the target: if you know where it is, you can kill it with conventional weapons; if you do not, even nuclear weapons will not help. The implication is that even though counterforce capabilities are crucial, nuclear weapons are not needed for this mission.

This criticism is wrong, because there is a substantial difference between the expected effectiveness of conventional strikes and the expected effectiveness of nuclear strikes against a range of plausible counterforce targets. Even the most powerful conventional weapons—for example, the GBU-57 "Massive Ordnance Penetrator"—have an explosive power comparable to "only" 3–5 tons of TNT. By comparison, the least-powerful (according to open sources) nuclear weapon in the US arsenal explodes with the equivalent power of roughly 300 tons of TNT.[10] The higher yield of nuclear weapons translates to greater destructive radius and higher likelihood of target destruction.[11] Against ordinary targets, the accuracy and destructive power of conventional weapons is sufficient. Against nuclear targets—if success is defined by the ability to destroy *every* weapon targeted—the much greater destructive radius of nuclear weapons provides a critical margin of error.

Furthermore, in real-world circumstances delivery systems may not achieve their usual levels of accuracy. Jammers that degrade the effectiveness of guidance systems and active defenses that impede aircraft crews or deflect incoming missiles can undermine accuracy. Even mundane things

like bad weather can degrade wartime accuracy. Against hardened targets, conventional weapons must score a direct hit, whereas close is good enough when it comes to nuclear weapons. Lastly, many key counterforce targets are mobile. In those cases, nuclear weapons allow for greater "target location uncertainty" (when the target has moved since being observed) compared to their conventional counterparts.[12]

It is true that modern guidance systems have given conventional weapons far greater counterforce capabilities than ever before, but there is still a sizable gap between what nuclear and conventional weapons can accomplish.

"These arguments undermine US arms control and nonproliferation policy."

Finally, some critics suggest that whatever the truth of our claims, an open discussion of these issues is counterproductive because it undermines US arms control and nonproliferation objectives. They worry that our analysis emboldens defense hawks in other countries (particularly in Russia and China), undermines informal "Track II" diplomacy, and may catalyze foreign nuclear arms modernization. More broadly, by drawing too much attention to the leap in US nuclear capabilities and the utility of nuclear weapons for relatively weaker states, we undermine US efforts to delegitimize and prevent the spread of the nuclear weapons.

This critique is misguided for three reasons. First, other countries understand that the United States wields enormous counterforce capabilities and seeks to enhance them. For example, defense analysts in Russia and China closely watch and frequently comment on changes in US military capability. Moreover, potential US adversaries understand that nuclear weapons are uniquely suitable tools to deter a superior adversary or prevent catastrophic conventional defeat. This is why Pakistan relies on nuclear weapons to deter India; why Russia says it needs theater nuclear weapons; why Israel will not abandon the "Samson Option"; and why North Korea clings at such great expense to its nuclear weapons.

Second, stifling discussion of these issues is detrimental to US national security. For example, some defense analysts seem to have adopted the assumption that no country would deliberately use nuclear weapons against the United States, even though deliberate escalation was US policy when NATO felt it was too weak to defend itself against a Soviet invasion of Europe. If analysts continue to hold a false sense of the irrelevance of nuclear weapons even as US adversaries cling to them to

try to keep the United States at bay—and if analysts convince enough policymakers to do the same—there is a real danger the United States could stumble into a nuclear war. The lack of open discussion about the role of nuclear weapons is compounded by the constraints of security classification, which further limits the ability of policymakers to explain important issues. In short, ignoring these issues—not discussing them—is the real danger.

Finally, unless they recognize the strategic incentives faced by countries like North Korea, Pakistan, Iran, and China, US leaders are susceptible to misattributing malign and aggressive intentions from those countries' efforts to acquire nuclear weapons or modernize delivery systems and arsenals. Unless US leaders understand that other countries rely on nuclear systems to keep more powerful potential adversaries in check—and unless they acknowledge to themselves that the United States is working steadily to neutralize adversary deterrent forces—they are more likely to misperceive enemy efforts to develop a robust deterrent force as a clear sign of hostility and as evidence that the other country is out of step with international standards of behavior. Simply put, the United States may prefer that its adversaries disarm or remain unarmed and thus leave themselves vulnerable to US power, but the fact that they often do not should not be misperceived as a sign of aggression.

Conclusion

The arguments we advance here raise new puzzles for scholars and pressing issues for policymakers. Scholars need to reexamine much of the established wisdom about nuclear deterrence. From Schelling's early works to the present, many scholars have explored nuclear deterrence dynamics by modeling coercion under conditions of mutual vulnerability. Those models suggest that deterrence success depends principally upon resolve rather than capabilities (because the capability of each side to inflict unacceptable damage is an assumption of the model). Schelling's formulation made sense when he developed it—to explore the challenges of Cold War deterrence under conditions of MAD—but the same analytic framework is still used today even though many nuclear dyads are not characterized by nuclear stalemate. The counterforce revolution means that nuclear exchanges may not lead to mutual devastation—one party may suffer far less or even be spared entirely. Analytical models and conclusions derived from them (for example, about the importance

of resolve over capabilities for deterrence success) need to be reexamined and updated.

The challenges facing US policymakers, given the changes in the nuclear landscape, are profound. They must find a way to build sufficient counterforce capabilities to protect the United States and its allies from quite plausible adversary escalatory strategies—all the while avoiding building so much capability that it triggers a Cold War–style arms race with Russia and China. They must direct the US military to develop concepts for waging *conventional* war against nuclear-armed adversaries that would permit the United States to achieve its military objectives yet reduce the incentives for adversary escalation.

Perhaps most fundamentally, US leaders must encourage a more transparent and public debate about the roles and missions of US nuclear forces—and the capabilities that must be retained in the arsenal to execute those missions. Unfortunately, many contemporary nuclear analysts, policy advocates, and policymakers seek to minimize discussion about nuclear weapons and simply assert that nuclear weapons are not particularly useful in the twenty-first century. That is a dangerous approach. The very reason the United States relied on nuclear weapons in the past is the reason potential US adversaries will rely on them now and in the future: nuclear weapons are a powerful deterrent against conventionally superior adversaries. In short, we need to be honest about why states rely on nuclear weapons, as we once did, and the dangers this poses for the United States and its allies. SSQ

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Notes

1. See Keir A. Lieber and Daryl G. Press, "The Rise of U.S. Nuclear Primacy," *Foreign Affairs* 85, no. 2 (March/April 2006): 42–54; Lieber and Press, "The End of MAD? The Nuclear Dimension of U.S. Primacy," *International Security* 30, no. 4 (Spring 2006) 7–44; Peter C. W. Flory, Keith Payne, Pavel Podvig, Alexei Arbatov, Lieber, and Press, "Nuclear Exchange: Does Washington Really Have (Or Want) Nuclear Primacy," *Foreign Affairs* 85, no. 5 (September/October 2006): 149–57; Jeffrey S. Lantis, Tom Sauer, James J. Wirtz, Lieber, and Press, "The Short Shadow of U.S. Primacy?" *International Security* 31, no. 3 (Winter 2006/07): 174–93; Lieber and Press, "U.S. Nuclear Primacy and the Future of the Chinese Nuclear Deterrent," *China Security Quarterly*, no. 5 (Winter 2006/07): 66–89; Lieber and Press, "Superiority Complex: Why America's Growing Nuclear Supremacy May Make War with China More Likely," *Atlantic Monthly* 300, no. 1 (July/August 2007) 86–92; Lieber and Press, "The Nukes We Need: Preserving the American Deterrent," *Foreign Affairs* 88, no. 6 (November/December 2009): 39–51; Jan Lodal, James M. Acton, Hans M. Kristensen, Matthew McKinzie, Ivan Oelrich, Lieber, and Press, "Second Strike: Is the U.S. Nuclear Arsenal Outmoded?" *Foreign Affairs* 89, no. 2 (March/April 2010): 145–52; and Lieber and Press, "Obama's Nuclear Upgrade: The Case for Modernizing America's Nukes," *Foreign Affairs* (July 2011, Postscript).

2. We use "revolution in accuracy" as shorthand for a broad set of changes (still underway) that stem from the integration of computers into warfare. Among other things this has led to vastly improved guidance, surveillance, and command and control systems. Each of these improvements has greatly increased the ability to locate targets and precisely deliver munitions.

3. It is essential to differentiate the 1950s—during which the United States possessed a potent disarming capability against the Soviet Union—from the subsequent era of Cold War stalemate. During the 1950s, the US nuclear force far outmatched the meager Soviet arsenal. Until 1956, the Soviet Union had no weapons with the range to reach the United States, and even in the latter parts of the decade Moscow's rudimentary long-range nuclear arsenal was highly vulnerable to a nuclear disarming strike. The United States recognized its huge advantage and planned to fight and win World War III—if it occurred—by launching a massive nuclear disarming strike on the Soviet Union. Ironically, the era that spawned the term "mutual assured destruction (MAD)" was not characterized by the condition of MAD; nuclear stalemate only emerged later. See Lieber and Press, "Nuclear Weapons and International Politics," unpublished book manuscript.

4. See, for example, the fallout models in William Daugherty, Barbara G. Levi, and Frank von Hippel, "The Consequences of 'Limited' Nuclear Attacks on the United States," *International Security* 10, no. 4 (Spring 1986) 3–45; and Levi, von Hippel, and Daugherty, "Civilian Casualties from 'Limited' Nuclear Attacks on the USSR," *International Security* 12, no. 3 (Winter 1987/88): 168–89.

5. The accuracy revolution has greatly increased the probability that a given warhead will destroy a hardened target, but the full range of consequences is much broader. For example, high accuracy allows targeteers to assign many weapons to a given target, greatly increasing the odds of a successful strike. In the past, "many-on-one" targeting was difficult because weapons that missed their targets—but which detonated nearby—might create dust clouds that would shield the target from additional incoming warheads. This problem of "fratricide" has been essentially eliminated by the leap in accuracy. See discussion in Lieber and Press, "End of MAD?" 20–22. Additionally, the revolution in accuracy permits planners to target an enemy's hardened nuclear sites using low-yield weapons, set to detonate as airbursts, thereby vastly reducing fallout and collateral damage. See Lieber and Press, "The Nukes We Need," including the "Technical Appendix." We have subsequently redone the calculations underpinning

our models of hypothetical counterforce strikes using the US Department of Defense VNTK (Vulnerability Number for Thermonuclear Kill) damage assessment system, and the core results are confirmed. (Contact authors for information on those results.)

6. Our analysis turned out to be a highly provocative exercise for some, including many Russian policymakers and analysts. See, for example, "Russian Media See Article on U.S. Nuclear Primacy as Provocation," *OSC Analysis*, 3 April 2006; "Replying to Foreign Affairs Article, Expert Mulls Nuclear Arms Programs," *Krasnaya Zvezda*, 12 April 2006, translated in OSC, Doc ID: CEP20060411330004; Pavel K. Baev, "Moscow Puts PR Spin on its Shrinking Nuclear Arsenal," *Eurasia Daily Monitor*, 17 April 2006; "Moscow Rejects U.S. Authors' Claims of U.S. First-Strike Capability, as Putin Protects Nuclear Weapons Infrastructure," *WMD Insights*, issue 5 (May 2006): 17–21; and "Chinese Media Discusses U.S. Nuclear Superiority," ibid., 15–17.

7. The experience of leaders who recently lost wars to the United States is enlightening. In 1989 the United States conquered Panama and arrested its leader, Manuel Noriega; he has so far spent 23 years in prison. Saddam Hussein lost power, his sons were killed, and he was humiliated and hung in front of cheering enemies. Muammar Qaddafi spent his last days hiding from US-supported rebels, who eventually found him and beat him to death on the side of a road. Even leaders whose countries were never conquered—i.e., they only suffered "limited" military defeats—often paid a high price. The Bosnian Serb leaders Radovan Karadzic and Ratko Mladic are in prison in The Hague, where Serbia's former leader, Slobodon Milosevic, died in detention.

8. "Roundtable on U.S. Nuclear Posture: Assessing the Lieber-Press Series in *Foreign Affairs*," Annual Conference of the International Security Studies Section (ISSS) of the International Studies Association and the International Security and Arms Control Section (ISAC) of the American Political Science Association, in conjunction with the Triangle Institute of Security Studies, 5 October 2012, Chapel Hill, North Carolina.

9. During the 2011 military intervention in Libya, the North Korean government proclaimed that NATO's action "teaches the international community a serious lesson" about the consequences of "nuclear dismantlement"—namely, it meant for Libya that the United States "swallowed it up by force." "Foreign Ministry Spokesman Denounces U.S. Military Attack on Libya," *Korea News Service*, 22 March 2011. The US State Department response—that NATO's action in Libya "has absolutely no connection with [Libya] renouncing their nuclear program or nuclear weapons"—obfuscates the issue because the North Korean claim was that the lack of Libyan nuclear weapons *permitted* (not triggered) NATO's attack. *New York Times*, 24 March 2011. That the North Korean regime's statement was more frank than the US one indicates the deep contradictions in US policy between the lofty proposals for nuclear disarmament and the desire to be able to use military force effectively against adversaries around the globe.

10. According to open sources, the lowest-yield setting of the B61 bomb is 0.3 kilotons, which means the equivalent of 300 tons of TNT. The GBU-57 explodes with roughly 1 percent of the B61's explosive power.

11. As a rule of thumb, destructive radius typically varies as a function of "yield" to the one-third power, so the B61 would have roughly 4.5 times the destructive radius of the most powerful conventional weapon.

12. Low-yield nuclear weapons could be detonated at altitudes that would create a sufficiently large lethal area on the ground against mobile missile systems to account for the target location uncertainty that is often created by lags between "sensor," "shooter," and "munition arrival" without subjecting large areas of enemy territory to destruction and without creating fallout.

The Common Sense of Small Nuclear Arsenals

James Wood Forsyth Jr.

Common sense is not what we put into the world. It is what we find there.

—Jacob Bronowski

With the publication of President Obama's security strategy, entitled *Sustaining U.S. Global Leadership: Priorities for 21st Century Defense*, it appears US policymakers are interested in reducing the size of America's nuclear arsenal.[1] This seems to make sense. Reducing the number of nuclear weapons in the world has been part of the American security agenda for some time. Interestingly, as the United States seeks yet another round of nuclear arms reductions, the number of states with small nuclear arsenals has risen, albeit slowly, throughout the world. As of 2010, nine states possessed nuclear weapons. The United States and Russia each has thousands, with estimates running as high as 20,000 between them. The remaining seven states share a combined total of approximately 1,000.[2] In this regard, the United States and Russia appear to be out of line with the rest of the world; small nuclear arsenals, not large ones, are the global norm. As the United States contemplates a change in its nuclear posture, might a new epoch in the evolution of nuclear history and strategy be emerging? Has the age of small nuclear arsenals truly arrived?[3]

Small nuclear arsenals are not new, per se. For a variety of reasons, France developed a small, independent nuclear arsenal after World War II.[4] It kept its force levels comparatively low, even during the Cold War when the arms buildup in the Soviet Union would have seemed to threaten its very existence. France's behavior is not unusual, however. The majority of states with nuclear arsenals have opted to keep them relatively small; they have not acquired large numbers of nuclear weapons, as was the habit of the superpowers during the Cold War. Instead, these states seem content with a small force capable of warding off an attack as

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well as dissuading others from interfering in their internal and external affairs. That pattern is continuing and, therefore, is worth examining.

In this article I use structural theory to explain what I call "the common sense of small nuclear arsenals." The central claim advanced here is that small numbers of nuclear weapons seem to socialize leaders to the dangers of adventurism and, in effect, halt them from behaving recklessly or responding recklessly to provocation.[5] This is a bold and somewhat dangerous claim, so it is important to elaborate the argument. Like many, I believe nuclear weapons are here to stay for the foreseeable future, however regrettable that might be, and I make no claims about the durability of deterrence. Deterrence may indeed fail one day, but if it does, it will not be because leaders are insensitive to the punishments they face should they choose to use a nuclear weapon. If leaders were insensitive to punishment, deterrence would not work at all. Furthermore, mine is a state-centric argument. Why? States remain, for better or worse, the most important actors in international politics. That is not to say they are the only actors. Clearly, they are not. But should the day come when a nonstate actor obtains a nuclear weapon, it will, in all likelihood, be provided by someone connected to a state.

I begin the argument by examining the dynamics of deterrence and dissuasion and then explain small nuclear arsenals in terms of structural theory, relying most heavily on the effects of socialization. Lastly, I outline some concerns for policymakers.

The Dynamics of Deterrence and Dissuasion

Nuclear weapons, more so than any other, "hold power at bay," as Bernard Brodie so aptly put it.[6] In what remains one of the most quoted statements in the field of national security studies, Brodie summarized the message of his book *The Absolute Weapon* with these words: "Thus far, the chief purpose of our military establishment has been to win wars. From now on, its chief purpose must be to avert them. It can have no other useful purpose."[7] As a RAND analyst, Brodie would develop a deep understanding of nuclear weapons and their destructive potentialities. For illustrative purposes, this cannot be overstated: one 300-kiloton weapon is more than enough to destroy a city the size of London. If a bomb of that size were detonated above Trafalgar Square on a workday, approximately 240,000 people would die instantly, and

410,000 casualties would be sustained. Nearly everything within a 3-km radius would be destroyed, with burn victims reaching out as far as Victoria Park. The same bomb detonated above Mumbai on a workday would kill over one million people and produce more than two million casualties.[8] Even if one were to assume the worst, a "bolt from the blue" in which a state lost 50 percent of its nuclear capability to a first strike, a relatively small force of even 100 weapons would allow that state to strike back over 50 times before it had to negotiate.[9] Common sense would tell us that few states, if any, could withstand that sort of punishment, and even fewer leaders would run that sort of risk. Nonetheless, as deterrence strategy evolved, discussions often focused on the idea that it was difficult to achieve.[10]

In the Eisenhower years, "massive retaliation" was the phrase used to describe how America would respond to a Soviet attack. Certainly, deterrence must have been presumed to be difficult if one had to threaten to respond massively to achieve it. As the Soviet arsenal grew, MAD (mutually assured destruction) became the acronym for the notion that deterrence depended upon the capability and the will to destroy a country. Beginning in the 1960s, assured destruction became the emphasis, and the policy became something of a two-headed monster. Not only was deterrence difficult to achieve, but the thought it might fail made the very attempt to achieve it doubly dangerous. Henry Kissinger made this plain when he counseled European allies not to keep "asking us to multiply strategic assurances that we cannot possibly mean or if we do mean, we should not want to execute, because if we execute, we risk the destruction of civilization."[11]

Throughout the Cold War the idea that deterrence was difficult cast a long shadow. But as the Cold War evolved, so, too, did analysts' thinking.[12] When the Eisenhower administration introduced its New Look policy in January of 1954, John Foster Dulles left the world with the impression that aggression anywhere would elicit heavy nuclear retaliation. Just three months later, he amended that policy. To deter major aggression, Dulles thought, "the probable hurt" only needs to "outbalance the probable gain."[13] In the 1960s, the Kennedy administration recognized both the need for a secure retaliatory capability and the fact that the services desired to purchase capabilities far in excess of that need.[14] It therefore sought to program capabilities that would be invulnerable to a counterforce strike and would be able to inflict unacceptable damage

on the Soviet Union—but no more.[15] Looking back, Secretary of Defense McNamara had this to say:

> Our goal was to ensure that [the Soviets], with their theoretical capacity to reach such a first-strike capability, would not outdistance us. But they could not read our intentions with any greater accuracy than we could read theirs. The result has been that we have both built up our forces to a point that far exceeds a credible second-strike capability against the forces we each started with. In doing so neither of us has reached a first-strike capability.[16]

In other words, both sides were deterred fairly early on, even though that may not have been the intention.

Similarly, reflecting on what he learned from the Cuban missile crisis, Kissinger remarked that the Soviet Union had only "60–70 truly strategic warheads while we had something like 2,000 in missiles and bombs. . . . [But] with some proportion of Soviet delivery vehicles surviving, the Soviet Union could do horrendous damage to the United States."[17] Since there was no way to ensure our force of 2,000 could destroy their smaller force of 60 or 70, the crisis exemplified how a small force could inhibit the use of a large one. Along these lines, National Security Advisor McGeorge Bundy concluded, "A decision that would bring even one hydrogen bomb on one city of one's own country would be recognized in advance as a catastrophic blunder; ten bombs on ten cities would be a disaster beyond history; and a hundred bombs on a hundred cities are [*sic*] unthinkable."[18]

Whatever its logical shortcomings, it is important to stress that deterrence worked—it kept the Cold War "cold" and allowed international life to go on without a catastrophic nuclear war. After 70 years, most analysts agree on the basic dynamics of deterrence, and the contemporary debate regarding deterrence, when not addressing the problem of nonstate actors, tends to pivot on force structure considerations.[19] Here, the behavior of states with small nuclear arsenals is instructive. As previously mentioned, most states with nuclear arsenals have not acquired large numbers of nuclear weapons. Instead, they appear content with a relatively small arsenal capable of warding off an attack as well as dissuading others from interfering in their internal and external affairs. But of the two roles nuclear weapons seem to play—deterrence and dissuasion—is one more important than another? For India and Pakistan, nuclear weapons play a decidedly deterrent role. But if one were to free Britain of its NATO obligations, who exactly would Britain be deterring today?

What about France? Neither of these countries is as hard-pressed in the security arena as India or Pakistan, yet both hold on to nuclear weapons. While nuclear weapons still "hold power at bay," one must wonder whose power is being held at bay and how.

It is important not to overinterpret this. Nuclear weapons serve a purpose. How else can one explain why nine states have them, while others appear to want them? But what purpose do they serve, in general? To answer that question, one must look at what nuclear weapons do for states. Among other things, nuclear weapons socialize leaders to the dangers of adventurism and, in effect, halt them from behaving or responding recklessly to provocation.[20] Statesmen may not want to be part of an international system that constrains them, but that is the system that results among nuclear powers. Each is socialized to the capabilities of the other, and the relationship that emerges is one tempered by caution despite the composition, goals, or desires of its leaders. In short, nuclear weapons deter *and* dissuade.

Dissuasion is not a new term, but it is one that lacks specificity. The use of the term here stems from the work of Patrick Morgan, whose thoughts on general deterrence are particularly useful. Dissuasion and general deterrence share many common elements. Both are rooted in deterrence theory and share an emphasis on uncertainty and ambiguity. Like general deterrence, dissuasion is "complicated and ambiguous, hard to analyze." Because it is amorphous, theorizing about general deterrence has been difficult. The same can be said for dissuasion.[21] But deterrence and dissuasion are not two sides of the same coin; they differ in a number of important respects.

Deterrence involves "setting the stage—by announcement, by rigging the tripwire, by incurring the obligation—and waiting. The stage-setting can be non-intrusive, non-hostile, and non-provocative, but the act to be deterred is always intrusive, hostile, and provocative. The deterrent threat changes the consequences only if the act in question—the one being deterred—is then taken."[22] Dissuasion need not be announced; there are no tripwires or obligations, no waiting or threats. Dissuasion does not change the consequences of a specific act in question but does, through socialization, change the nature of state relations. Deterrence is specific; dissuasion is more general. For deterrence to work, one "must dig in or lay a mine field."[23] For dissuasion to take hold, one need only possess mines, albeit nuclear ones. In this regard, the pursuit of power to de-

ter *and* dissuade marks a difference in relations among nuclear powers today. The relationship among China, Russia, and the United States is instructive.

China's nuclear numbers remain puny compared with those of Russia and the United States. Yet, despite these large nuclear inequities, China continues to modernize its conventional and nuclear capabilities, extending its influence throughout the region. How does one explain this behavior? Apparently, China has reasoned that its small nuclear arsenal is sufficient to socialize rivals to the dangers of war. There is little that Russia or the United States can do militarily to prevent China from pursuing its armament programs or vice versa. The presence of even a small number of nuclear weapons makes talk of war reckless, so leaders on all sides try to avoid it. Yet, it would be a mistake to suggest that China is actively deterring the United States or Russia in the same manner that the superpowers deterred one another during the Cold War. Instead, it might be more precise to conclude that the three countries have tacitly entered into a period of mutual dissuasion; nothing official has been declared, but all know the stakes are too high for anyone to engage the other militarily. If leaders in China, Russia, and the United States understand this, others do as well, which is why the slow spread of small nuclear arsenals (i.e., nuclear proliferation) is likely to continue.

Why Numbers Don't Count

Strategists have long recognized that throwing more men and weapons into battle may increase the carnage but not necessarily procure victory. The same holds true with nuclear numbers. Simply put, large arsenals buy statesmen little. This presupposes that statesmen are not sensitive to the actual number of nuclear weapons a state may possess; they are sensitive to whether or not it has one at all. The mere fact that a state may have a nuclear weapon or seek to acquire one seems to be sufficient to condition statesmen to act cautiously. As Steven Walt aptly put it, American policymakers understand this logic, or "they would not be so worried when a state like North Korea or Iran makes a move to join the nuclear club."[24] This begs the question, How many nuclear weapons do states need to achieve relative security? That is a big question for which there is, theoretically, a small solution: an arsenal that an adversary might be able to take out with a first strike and one it knows it cannot. Since

deterrence holds as a result of a viable second-strike capability, the capability to dissuade need not be large.[25]

But suppose an adversary were contemplating a first strike. What do you believe the second question put to the leader would be? It might be, And which city of ours are we willing to give up in exchange? The example is illustrative for two reasons. First, strategy is not contingent upon just the first move but also the following ones.[26] Second, in high-stakes games like nuclear war, second- or third-round moves are riddled with danger, so everything turns on preventing the first move, which makes the game relatively easy to understand and simpler to play. Moreover, leaders socialized to the dangers of nuclear weapons seem to understand that while numbers count, a small number of nuclear weapons are more than enough to dissuade the staunchest of rivals, even ones with comparably large nuclear numbers. Again, China's behavior is instructive.

As mentioned, China's nuclear numbers remain relatively small compared to those of the United States and Russia—approximately 400 nuclear weapons, with about 200 operationally deployed. China most likely possesses 30 intercontinental ballistic missiles (ICBM) capable of striking the continental United States and about 10 capable of striking Hawaii and Alaska. It also possesses roughly 100 intermediate-range weapons capable of striking US bases, friends, and allies in the Pacific region.[27] In contrast, the United States possesses approximately 450 ICBMs, each capable of carrying one to three warheads; 14 Trident submarines, each equipped with 24 submarine-launched ballistic missiles (SLBM) that carry as many as eight warheads each; and 100 or so nuclear bombers capable of carrying a variety of payloads to include air-launched cruise missiles (ALCM).[28] For illustrative purposes, let us assume Russia has a similar mix. As previously mentioned, despite these rather large nuclear inequities, China continues to modernize its conventional and nuclear capabilities, extending its influence throughout the region.

China behaves as if its small nuclear arsenal is sufficient to dissuade rivals. In international politics, dissuasion restrains states from acting externally but affords opportunities to act internally, allowing China to pursue whatever weapons it chooses. Shrewd states recognize this as well as the fact that large nuclear arsenals have a diminishing return. There seems to be little the United States or Russia can do militarily to prevent China from pursuing its armament program. This is not the same as saying that nothing can be done to influence China's policies.

China's economic, diplomatic, and military policies can be influenced by the coordinated economic, diplomatic, and military policies of the United States and Russia, but China's military designs are secured by its relatively small nuclear arsenal.[29]

Socialization, Nuclear Weapons, and Structural Theory

Since the advent of nuclear weapons, there have been few wars among nuclear states. That is not the same as saying nuclear powers do not quarrel, threaten, or even fight proxy wars against one another—they do. But nuclear states rarely, if ever, fight wars against one another. Why? As previously mentioned, nuclear weapons seem to socialize leaders to the dangers of adventurism and, in effect, halt them from behaving recklessly. In short, the risk of nuclear war makes leaders risk-averse; they must act with deliberate restraint, carefully plotting their courses of action in terms of how other nuclear leaders might react, even if they would prefer not to. Along with the "democratic peace" theory—which has been touted as the closest thing we have to an empirical law of international behavior—the "long peace" among nuclear powers is impressive.[30]

Some might have difficulty imagining why nuclear leaders would behave in the manner described here, so a brief discussion on the role of structure in international politics is warranted. Structural analysis addresses the positioning of actors in social and political systems—the properties and relations that make them parts of a system.[31] Within the field of international politics, most scholars accept Waltz's tripartite conception of structure (functional differentiation, ordering principles, and power distribution). In the standard Waltzian account, international systems are largely undifferentiated—and pretty much all the same. States are assumed to be "like units" made different only by their position among other states, strong states being privileged over weak ones. Anarchy is the "ordering principle" of international systems, meaning that there is no higher authority to which states can appeal to reconcile differences or ensure their survival. Power is distributed unevenly throughout the system, so states are unequal—making international systems unequal. To say structural theory provides a positional picture of politics is to say that states can be measured in terms of how they stack up against one another in terms of relative power. Few things affect this "stacking up" more than nuclear weapons, which is why statesmen pay attention to who has these weapons and if they might be used against them.

To say that nuclear weapons socialize leaders to the dangers of adventurism is to say that leaders pay attention to survival, because no one else can do so for them; the structure of international life prohibits it. In this sense, the "survival motive" is law-like. All human conduct is shaped in some measure by what individuals believe to be general laws. In science, laws establish relations between variables. Kepler's laws of planetary motion described the orbits of the planets by proving that a planet "sweeps out equal areas of its ellipse in each equal interval of time."[32] That is not how I use the term here, for in international politics there are no laws that operate with such fidelity. There are, however, softer, law-like relationships. "Such relationships are not based on a linkage that has been found, but on one that has been found repeatedly."[33] To assert that democracies do not fight wars against one another is to make a law-like statement. Moreover, states, like humans, respond to signals and interpret them by putting them into some general category thought to be law-like. As Jacob Bronowski noted, "We then assume that the future will have some general likeness with futures we have met before which followed this kind of signal, and this is the kind of future we prepare for."[34] Few things send a stronger signal to statesmen than the threat of nuclear war, and in this regard, the threat of nuclear war plays a socialization role. Since socialization is important to this discussion, we need to be clear about its meaning.[35]

Socialization refers to a relationship between at least two parties where "*A* influences *B. B*, affected by *A*'s influence, then influences *A."* As Waltz put it, "Each is not just influencing the other; both are being influenced by the situation their interactions create." Moreover, the behavior of the pair cannot be "apprehended by taking a unilateral view of either member."[36] Each acts and reacts in accordance with the other. The "global teenager" provides an example of the socialization process that occurs throughout the world. No one tells all the teenagers in the world to dress alike, but most of them do most of the time.

Likewise, no one tells all the states in the world to behave themselves, but most of them do most of the time. States are socialized to this idea by interacting with other states, particularly the great powers—whose role it is to set and enforce the rules of the game. In both instances, socialization is "a process of learning to conform one's behavior to societal expectations" and a "process of identity and interest formation."[37] Socialization draws members of a group into conformity with its norms.

Socialization also encourages similarities in behavior. Analogically speaking, nuclear relationships are like economic markets in that both are about self-help. They are also "individualist in origin, spontaneously generated, and [may even be] unintended."[38] But unlike markets, which can be left to their own devices to self-correct in times of disequilibrium, nuclear relationships must be corrected by leaders in times of crisis. This can be explained in terms of structural theory and the socializing effect of the survival motive. Because no higher authority exists to protect states from the harmful intentions of others, statesmen must pay attention to survival. Nothing threatens survival more than the threat of nuclear war, which is why nuclear statesmen are so highly sensitive to it. Even more importantly for this discussion, statesmen do not seem to be sensitive to the actual number of nuclear weapons a state might possess, only whether or not a state possesses any at all. From this, can one conclude that nuclear leaders act with law-like regularity? The Cuban missile crisis and the Kargil conflict are illustrative.

During the Cuban missile crisis, Kennedy and Khrushchev sought solutions short of war, despite their sharp political, cultural, and economic differences.[39] That the Soviets might have underestimated how the United States would react when confronted with a relatively small number of missiles based off the coast of Florida is not as telling as how both leaders behaved when they realized what was at stake. Secretary of State Dean Rusk's comment that "We were eyeball to eyeball" is illustrative for several reasons. First, the two sides were staring into the face of grave danger. Second, both grasped the importance of avoiding nuclear war. Lastly, even though the situation was riddled with ambiguity, the two sides recognized that the outcome of the crisis depended as much on the moves of one side as it did the other. One quotation is representative of many others.[40] In a meeting with the Joint Chiefs of Staff, President Kennedy outlined what was on his mind:

> If we attack Cuban missiles, in any way, it gives them a clear line to take Berlin, as they were able to do in Hungary under the Anglo war in Egypt. We would be regarded as the trigger-happy Americans who lost Berlin. We would have no support among our allies. We would affect the West Germans' attitude toward us. And people would believe that we let Berlin go because we didn't have the guts to endure Cuba.
>
> If we go in and take them out in an air strike . . . we increase the chance greatly, as I think—there's bound to be a reprisal from the Soviet Union, there always is—of their just going in and taking Berlin by force. Which leaves me one alter-

> native, which is to fire nuclear weapons—which is a hell of an alternative—and begin a nuclear exchange, with all this happening.[41]

During the entire crisis, the number of Soviet nuclear weapons on Cuban soil was never the focal point of US concern; in fact, the true number of these weapons—strategic and tactical—was not known until many decades later. The avoidance of nuclear war was the focal point; the threshold easily recognized, best not crossed, and worth avoiding. As early as 1962, the superpowers understood that they could race to the brink but no further, lest they run the risk of nuclear war; a risk that neither side would willingly take. Following the crisis, both sides took steps to reduce uncertainty and improve crisis stability.

As Kennedy and Khrushchev became increasingly socialized to the possibilities of nuclear war, the relationship that emerged was tempered by caution in that each leader sought solutions short of war. Something similar seems to have occurred during the Kargil conflict between India and Pakistan. Prior to acquiring a relatively small nuclear capability, Pakistan fought three bloody wars with India. Today, with both parties possessing nuclear forces, the sharp differences that separate India and Pakistan have not been sufficient to drive either side to war.[42] While the two sides actively engage in a game of tit-for-tat, nuclear weapons seem to have socialized leaders to the dangers of nuclear war, and as a result, the relationship between them has steadied. Far from perfect, relations between India and Pakistan can be summarized as tense but stable.[43]

The presence of nuclear weapons played a role in shaping the character of the Kargil conflict, the first conflict between nuclear-armed India and Pakistan. A retrospective look indicates that neither side actually threatened the other with the use of nuclear weapons.[44] This was not clear during the conflict, however. According to one source, nuclear threats were issued between Pakistan and India no fewer than 13 times.[45] The most prominent of these was made by Pakistan's foreign secretary Shamshad Ahmad when he stated, "We will not hesitate to use any weapon in our arsenal to defend our territorial integrity."[46] Additionally, it was believed that both sides increased their nuclear readiness levels.[47] US intelligence agencies believed Pakistan had mobilized and was arming its missiles with nuclear warheads—a fact that caused President Clinton to lean heavily on Prime Minister Sharif to withdraw Pakistani forces and bring the conflict to an end.[48] India, too, had reportedly placed its forces at

"Readiness State 3"—preparing aircraft as well as short- and medium-range ballistic missiles for use.[49]

Whether overt threats were exchanged or nuclear forces mobilized seems to have mattered less than the presence of nuclear weapons. That is, nuclear weapons seem to have played a role in how each side fought during the conflict. Of the two states, India was most notable for the restraint it put on its armed forces. Unlike in previous military responses to Pakistani aggression, Indian leadership took great care to avoid sending Indian forces into Pakistani territory.[50] According to P. R. Chari, Indian forces "were under strict orders not to cross the LoC [Line of Control] under any circumstances. Hot pursuit of retreating enemy forces was not permitted, nor could their bases across the LoC be attacked."[51] Additionally, though it may have been militarily prudent to divert Pakistani attention, India refrained from taking the fight outside of the immediate Kargil region.[52]

Although the cover of nuclear weapons may have played a role in convincing Pakistan it could get away with the initial incursion, when the miscalculation became apparent, Pakistan showed careful resolve to avoid further escalation. Like India, Pakistan may have benefitted from opening a second or multiple fronts, but even in the face of India's successful counteroffensive, Pakistan limited the fighting to the Kargil region.[53]

Nuclear weapons also ensured that diplomatic channels remained open between Pakistan and India throughout the conflict. Pakistani and Indian leadership met both officially and in secret in attempts to defuse the situation and prevent further escalation.[54] The presence of nuclear weapons almost certainly ensured the international community took a more active role in ending the conflict. The United States, in particular, went to great lengths to encourage both India and Pakistan to avoid escalation and end the conflict. As noted above, pressure from President Clinton may have been the final deciding factor in Sharif's decision to withdraw Pakistani troops.

From the perspective of socialization, the behavior of India and Pakistan cannot be resolved into a simple set of two-way interactions. To say each side was interacting, with the action of one eliciting a reaction from the other, obscures the socialization effects produced by their interactions. "Each acts and reacts to the other. Stimulus and response are part of the story. But also the two of them act together in the game, which—no less

because they have devised it—motivates and shapes their behavior. Each is playing to each other and to the tensions their interactions produce."[55] Because socialization draws members of a group into conformity with its norms, it reduces variety. Conformity to group norms and reducing variety are essential elements in creating and sustaining persistent relations within and among states. The persistent characteristics of group behavior result in part from the qualities of its members and in part from the characteristics of the relationship their interactions produce.[56] In this sense, nuclear relationships, as exemplified by the behavior of the United States, Russia, India, and Pakistan seem to be cautious ones. From this, one should not conclude that nuclear leaders behave with law-like regularity. But one can infer that nuclear leaders, even in times of crisis, tend to seek solutions short of all-out war, which is another way of saying the possibility of nuclear war makes them risk-averse.

Anticipating Three Objections

Critics will contend that the kind of restraint noted above rests on a presumed level of rationality not found in the real world. In fact, the opposite seems to be true. It is more difficult to find an example of the irrational actor in the real world than a rational one. What, exactly, is an irrational actor? Is it a state that violently disagrees with the policies of the United States? If that is the case, there are precious few. North Korea and Iran might fit this description, although neither is particularly violent, at least toward the United States. On the other hand, it could be someone who fits the literal meaning of the word "irrational." An actor is said to be irrational if he or she demonstrates an inability to reason, but in international politics those actors are hard to find. Instead, what one finds are fairly reasonable actors who formulate decisions based on their interpretation of the world around them. Few things shape the "world around them" more than the presence of nuclear weapons, which is why nuclear leaders behave cautiously when staring into the face of another nuclear leader. It should be noted that policies based on that sort of reasoning are neither rational nor irrational, but merely reasonable.

With respect to numbers, there are those who insist the United States must maintain a nuclear arsenal large enough to cover all contingencies. In other words, while China has to contend with the United States and Russia, the United States has a greater number of potential contenders

and needs a larger number of weapons to cover a larger number of options.[57] There is logic in that line of reasoning, but it tends to overemphasize the role of deterrence while overlooking the role of dissuasion. The United States *and* Russia are already dissuaded by China, even if that were or were not China's original intention. Presumably, if China's relatively small nuclear force is capable of dissuading the United States and Russia, it is also capable of dissuading India and Pakistan. In other words, China's small nuclear arsenal creates enough options for it to dissuade three regional nuclear powers as well as the United States. Unless one assumes the United States must guard against something far more dangerous than what China faces, it is reasonable to conclude that a relatively small nuclear force is all the United States needs to meet its security requirements. Arguments for a large force seem to lose their meaning unless they are tied to a counterforce strategy which, when judging by the behaviors of nuclear leaders, is not necessary. As McNamara's earlier remarks attest, the superpowers increased their nuclear numbers to prevent one side from acquiring a numerical advantage over the other. All the while, leaders on both sides lost sight of the fact that nuclear weapons, while incapable of producing military effects, are extremely capable of producing political ones.

Yet some "large number" strategists will wonder about the remotest of possibilities: the United States awakens one day to discover that all the nuclear powers in the world—including some of its staunchest allies like England, France, and Israel—have united against it. What then? To ensure deterrence holds in such a world, the United States would presumably need at least one more nuclear weapon than all the nuclear powers on Earth combined.[58] But again, even in this most bizarre of worlds, the socializing effects of nuclear weapons would be felt by all, because challengers could never be sure who the United States would strike first, which is something its leaders would have to threaten to do to ward off attack.

Lastly, some will argue that the United States should maintain a large enough arsenal so it can extend security guarantees to others. There is an important case to be made for such guarantees. Yet, while nuclear guarantees might be our fate, one wonders if they should be our de facto policy. As the Kissinger quote cited earlier suggests, guarantees can put guarantors in a tough spot. Perhaps the most important consideration when thinking about guarantees is whether they will prevent a

state from acquiring a capability of its own. France developed a nuclear capability of its own for a number of reasons, to include its history of strategic decline, serious questions about allies stemming from Dien Bien Phu and the Suez crisis, the expense of conventional rearmament, fears about its infantry becoming NATO cannon fodder, and the need to restore grandeur. If, above all else, France were motivated by a sense of grandeur, there seems to be little guarantees could have done—how could a security guarantee help France recapture its grandeur? The point being, states seek nuclear weapons for a variety of reasons. Some will be satisfied with guarantees; others might not. Understanding the conditions and contexts for extending guarantees—to include to whom and when—seems essential.[59]

Conclusions

Structural theory helps explain what I call "the common sense of small nuclear arsenals." The central claim advanced here is that small numbers of nuclear weapons seem to socialize leaders to the dangers of adventurism and, in effect, halt them from behaving or responding recklessly to provocation. Policymakers should rightly be concerned with the implications of this argument.

A state does not have to demonstrate a capacity to win a nuclear war to prevent one, because the devastating consequences of nuclear war are transparent, well understood, and universally recognized. McGeorge Bundy's comment is worth repeating: "A decision that would bring even one hydrogen bomb on one city of one's own country would be recognized in advance as a catastrophic blunder; ten bombs on ten cities would be a disaster beyond history; and a hundred bombs on a hundred cities are [*sic*] unthinkable."[60] There is, however, a divide between war fighters—who must think about such things—and arms controllers who work to reduce the number of weapons in the world. Both find common ground on this: from the beginning, nuclear weapons and US policy have been devised to prevent the outbreak of a nuclear war, not to win one.

On that axis, things like readiness, survivability, and flexibility are vital ingredients, and a robust nuclear triad appears the most effective scheme to prevent the outbreak of nuclear war. That small states can achieve relative security without one is telling. One wonders how US policymakers will react if China were to build a triad of its own? Would it be interpreted as a means to enhance security, or would it appear threatening?

With that in mind, the question for US policymakers seems to be what size nuclear force the United States needs to achieve relative security. It has been suggested that the United States could ensure its security with a relatively small force comprised of 311 nuclear weapons. That may not be the ideal number and, in fact, that number was suggested as a way to stimulate debate on nuclear strategy, not to close any doors regarding force structure.[61] As evidenced by the president's interest in reducing the size of America's arsenal, however, it is no longer unreasonable to think that a small force might be as capable of deterring and dissuading as a large one.

In the end, structural theory claims that the international system constrains what states can and cannot do. Nuclear weapons add to this by socializing leaders to the dangers of nuclear war. Seven of the nine nuclear states recognize this and have concluded that a small number of nuclear weapons are sufficient to deter and dissuade rivals. Might the United States become number eight? That is for policymakers to decide. It would seem to make common sense, but common sense is not what we put into the world; it is what we find there. SSQ

Notes

1. The authors write, "It is possible that our deterrence goals can be achieved with a smaller nuclear force, which would reduce the number of nuclear weapons in our inventory as well as their role in U.S. national security strategy." *Sustaining U.S. Global Leadership: Priorities for 21st Century Defense* (Washington: DoD, January 2012), 5.

2. Exact numbers are hard to come by. According to one article, Russia has approximately 12,000, the United States 9,400, France 300, China 240, Britain 225, Israel 60–80, Pakistan 70–90, India 60–80, and North Korea fewer than 10. Robert S. Norris and Hans M. Kristensen, "Global Nuclear Inventories 1945–2010," *Bulletin of Atomic Scientists* 66, no. 77 (October 2010). Other estimates put the US number closer to 5,000, placing the total inventory between Russia and the United States closer to 17,000.

3. I wish to thank Edwina Campbell, Steve Chiabotti, Chuck Costanzo, Richard Muller, Alex Roland, Tim Schultz, and two anonymous reviewers for their thoughtful comments and suggestions. Additionally, thank you to Jeremy Olson whose work as a SAASS student was superb, as is his unpublished thesis entitled, "The Best Defense: Making Maximum Sense of Minimum Deterrence," upon which I relied for the Kargil discussion.

4. France was motivated by its history of strategic decline, serious concerns about allies, the expense of conventional rearmament, and fears about its infantry becoming NATO cannon fodder, but above all, the need to restore greatness and grandeur. See Jurgen Brauer and Herbert Van Tuyall, *Castles, Battles and Bombs* (Chicago: Chicago University Press, 2008), 244–87.

5. This theme reverberates throughout this discussion and originates with Kenneth Waltz, *Theory of International Politics* (New York: McGraw Hill, 1979).

6. Bernard Brodie, *Strategy in the Missile Age* (Princeton, NJ: Princeton University Press, 1959), 275.

7. Bernard Brodie, *The Absolute Weapon* (New York: Harcourt Brace, 1946), 76.

8. International Commission on Nuclear Nonproliferation and Disarmament (ICNND), *Eliminating Nuclear Threats: A Practical Agenda for Global Policymakers* (Canberra and Tokyo: ICNND, November 2009, December 2009), http://www.icnnd.org/reference/reports/ent/index.html. For the general argument, see Barbara G. Levi, Frank N. Von Hippel, and William Daugherty, "Civilian Casualties from 'Limited' Nuclear Attacks on the Soviet Union," *International Security* 12, no. 3 (Winter 1987/88).

9. Included in this 50-percent loss are those weapons and their delivery systems that are not available or cannot reach their targets due to reliability and penetration issues. See Albert Wohlstetter, "The Delicate Balance of Terror," *Foreign Affairs* 37, no. 2 (April 1959).

10. For the workings of deterrence, see Brodie, *Absolute Weapon*; Lawrence Freedman, *The Evolution of Nuclear Strategy* (New York: Palgrave, 2003); William Fox, *The Superpowers: The United States, Britain and the Soviet Union* (New York: Harcourt and Brace, 1954); Alexander George and Richard Smoke, *Deterrence in American Foreign Policy: Theory and Practice* (New York: Columbia University Press, 1974); Morton Halperin, *Limited War in the Nuclear Age* (New York: John Wiley and Sons, 1963); Herman Kahn, *On Thermonuclear War* (Princeton, NJ: Princeton University Press, 1960); George Kennan, *Russia, the Atom and the West* (New York: Harper, 1958); Henry Kissinger, *Nuclear Weapons and Foreign Policy* (New York: Harper, 1957); Robert Osgood, *Limited War: the Challenge to American Strategy* (Chicago: Chicago University Press, 1957); Thomas Schelling, *The Strategy of Conflict* (Cambridge, MA: Harvard University Press, 1960); and Schelling, *Arms and Influence* (New Haven, CT: Yale University Press, 1966).

11. Henry Kissinger, quoted in Kenneth Waltz, "Nuclear Myths and Political Realties," *American Political Science Review* 84, no. 3 (September 1990).

12. See Emanuel Adler, "The Emergence of Cooperation: National Epistemic Communities and the International Evolution of Nuclear Arms Control," in *Knowledge, Power, and International Policy*, ed. Peter Haas (Columbia: University of South Carolina Press, 1997).

13. See Waltz, "Nuclear Myths and Political Realties," 733.

14. David Alan Rosenberg, "The Origins of Overkill: Nuclear Weapons and American Strategy 1945–1960," *International Security* 7, no. 4 (Spring 1983).

15. Alain Enthoven and K. Wayne Smith, *How Much is Enough: Shaping the Defense Program* (New York: Harper and Row, 1971).

16. *The Dynamics of Nuclear Strategy*, Department of State Bulletin LVII, 9 October 1967.

17. See Waltz, "Nuclear Myths and Political Realties," 734.

18. McGeorge Bundy, "To Cap the Volcano," *Foreign Affairs* 48, no. 1 (October 1969): 9–10.

19. See Fareed Zakaria, "GPS: What in the World? Nuclear Magic Number," *CNN*, 4 April 2010, http://transcripts.cnn.com/TRANSCRIPTS/1004/04/fzgps.01.html; David E. Hoffmann, "Despite New START, the U.S. and Russia Still Have Too Many Nuclear Weapons," *Washington Post*, 11 April 2010; Gary Schaub Jr. and James Forsyth Jr., "An Arsenal We Can All Live With," *New York Times*, 24 May 2010; Schaub and Forsyth, "Letters to the Editor: The Right Number of Nuclear Weapons?" *New York Times*, 31 May 2010, http://www.nytimes.com/2010/06/01/opinion/l01nuke.html; Max Berman, "Air Force Strategists Say US Should Unilaterally Cut Nukes By 90 Percent," *Wonk Room*, 17 March 2010, http://wonkroom.thinkprogress.org/2010/03/17/air-force-strategists-say-us-should-cut-nukes; and Charli Carpenter, "USAF Strategists: US Should Drastically and Unilaterally Reduce Nuclear Arsenal," *Lawyers, Guns and Money* blog, 18 March 2010.

20. Nuclear weapons also play a prestige or stature role, for example. See Suzanne Buono, "Demystifying Nuclear Proliferation: Why States Do What They Do" (PhD diss., Johns Hopkins, 2011).

21. Patrick M. Morgan, *Deterrence Now* (Cambridge, UK: Cambridge University Press, 2003). Also see David Yost, "Dissuasion and Allies," *Strategic Insights* 4, no. 2 (February 2005), for more recent usage of the term *dissuasion*.

22. Schelling, *Arms and Influence*, 71–72. For purposes of comparison, see Schelling's discussion on the differences between deterrence and compellence.

23. Ibid., 72.

24. Steven M. Walt, "All the Nukes You Can Use," *Foreign Policy,* 24 May 2010, http://walt.foreignpolicy.com/category/topic/military.

25. "Viable" assumes one possesses not only a survivable weapon but also a reliable means to deliver it.

26. I thank Everett Dolman for this.

27. William J. Perry and James A. Schlesinger, chairmen, *America's Strategic Posture: The Final Report of the Congressional Commission on the Strategic Posture of the United States* (Washington: US Institute for Peace, 2009), 10–11.

28. These numbers will be reduced by 2017 in compliance with the new Strategic Arms Reduction Treaty ("New START"). By that time, the United States is scheduled to have no more than 700 deployed strategic delivery vehicles (SDV).

29. If, as some suggest, China feels encircled by the American presence in the region, the United States must devise a strategy that will (1) recognize that China has legitimate interests in the region and find ways to accommodate China as it pursues them, (2) assure allies in the region that the growth of China's power does not threaten them, and (3) avoid actions that provoke the Chinese. Regarding all three, basing becomes a major concern. The recent deployment of 2,500 Marines to Australia might mark the beginning of a strategy designed to do all of the above.

30. The term *long peace* was introduced in John Lewis Gaddis, "The Long Peace: Elements of Stability in the Postwar International System," *International Security* 10 (Spring 1986): 92–142. On the law-like nature of the democratic peace, see Jack Levy, "The Causes of War: A Review of the Evidence," in *Behavior, Society and Nuclear War,* eds. Phillip E. Tetlock et al. (New York: Oxford University Press, 1989). For the philosophical argument, see Michael Doyle, "Kant, Liberal Legacies, and Foreign Affairs Parts I and II," *Philosophy and Public Affairs* 12 (1983): 205–35, 323–53. For a quantitative account, see Rudolph J. Rummel, "Libertarianism and International Violence," *Journal of Conflict Resolution* 27 (1983): 27–71. For an example of the structural account, see Clifton T. Morgan and Sally Campbell, "Domestic Structure, Decisional Constraints, and War: So Why Kant Democracies Fight?" *Journal of Conflict Resolution* 35 (1991): 187–221.

31. Jack Donnelly, "The Differentiation of International Societies: An Approach to Structural International Theory," *European Journal of International Relations* 18, no. 1 (2011): 151–76. As Donnelly suggests, Waltz's neorealism may have become pace, but structural theorizing has not. Also see Barry Buzan and Mathias Albert, "Differentiation: A Sociological Approach to International Relations Theory, *European Journal of International Relations* 16, no. 3 (September 2010): 315–37.

32. Jacob Bronowski, *The Common Sense of Science* (Cambridge: Harvard University Press, 1978), 27.

33. Waltz, *Theory of International Politics*, 1.

34. Bronowski, *Common Sense of Science*, 114.

35. A significant element of structural theory is the concept of socialization. For the definitive account of how socialization works on material concerns, see Waltz, *Theory of International Politics*, chap. 4 and 74–76. For the same regarding ideational ones, see Alexander Wendt, *Social Theory of International Politics* (Cambridge: Cambridge University Press, 1999).

36. Waltz, *Theory of International Politics*, 74–75.

37. Wendt, *Social Theory of International Politics*, 170.

38. Waltz, *Theory of International Politics*, 91.

39. Culture has become an important concern for the US military since 9/11. Often it is portrayed as a variable equal to or greater than force itself. Here, however, force seems to transcend cultural differences.

40. See Ernest R. May and Philip D. Zelikow, *The Kennedy Tapes: Inside the White House During the Cuban Missile Crisis* (Cambridge: Harvard University Press, 1997).

41. Ibid., 175–76.

42. The conflict began in May 1999 and ended in July of that year. During this time, Indian army units attacked Pakistani forces, and Indian jets bombed bases high in the Himalayan Mountains. Although Indian forces carefully stayed on their side of the line of control in Kashmir, Indian prime minister Atal Bihari Vajpayee informed the US government that he might have to order an invasion into Pakistan. Even though at least 1,000 Indian and Pakistani soldiers were killed during this crisis, I do not agree with those who think of Kargil as a war. Rather, my interpretation of Kargil is that the presence of nuclear weapons seems to have prevented a nasty skirmish from becoming all-out war. See Scott D. Sagen and Kenneth N. Waltz, *The Spread of Nuclear Weapons* (New York: W. W. Norton, 2003).

43. For an interesting perspective, see Sumat Ganguly, "Nuclear Stability in South Asia," *International Security* 33, no. 2 (Fall 2008): 45–70; and S. Paul Kapur, "Ten Years of Nuclear Instability in Nuclear South Asia," ibid., 71–94.

44. Timothy D. Hoyt, "Kargil: The Nuclear Dimension," in *Asymmetric Warfare in South Asia: The Causes and Consequences of the Kargil Conflict*, ed. Peter R. Lavoy (Cambridge: Cambridge University Press, 2009), 156.

45. Robert Wirsing, *Kashmir in the Shadow of War: Regional Rivalries in a Nuclear Age* (Armonk, NY: M. E. Sharpe, 2003), 49.

46. Ibid., 49.

47. Hoyt, "Kargil," 158.

48. P. R. Chari, "Reflections on the Kargil War," *Strategic Analysis* 33, no. 3 (2009): 363.

49. Hoyt, "Kargil," 158.

50. Ibid., 160.

51. Chari, "Reflections on the Kargil War," 362.

52. John H. Gill, "Military Operations in the Kargil Conflict," in *Asymmetric Warfare in South Asia*, 124.

53. Chari, "Reflections on the Kargil War," 363.

54. Peter R. Lavoy, "Why Kargil Did Not Produce General War: The Crisis Management Strategies of Pakistan, India, and the United States," in *Asymmetric Warfare in South Asia*, 194–96.

55. Waltz, *Theory of International Politics*, 75.

56. Ibid., 76.

57. I thank Stephen Wright for this.

58. In fact, numbers are only one part of the equation, although I believe them to be the most important part. Besides numbers, one must account for the size of the weapons, delivery systems, nature of targets, and defensive systems.

59. Guarantees may also increase moral hazard, emboldening states to take risks they would not ordinarily take if acting on their own. Additionally, they can be complicated by the dilemma of adverse selection; guarantors rarely know in advance if they have guaranteed a "worker or a shirker." That said, I do not think the United States should step away from its guarantees, but it is important to examine the value of such guarantees. Under what conditions are they most beneficial? For example, while it seems to make sense to afford a guarantee to Japan, is it reasonable to expect the United States to do the same for every potential NATO member? See Brauer and Tuyall, *Castles, Battles and Bombs*, 261–65.

60. McGeorge Bundy, "To Cap the Volcano," *Foreign Affairs* 48, no. 1 (October 1969): 9–10.

61. See James W. Forsyth Jr, Chance Saltzman, and Gary Schaub Jr., "Remembrance of Things Past: The Enduring Value of Nuclear Weapons," *Strategic Studies Quarterly* 4, no. 1 (Spring 2010): 74–89.

US Extended Deterrence

How Much Strategic Force Is Too Little?

David J. Trachtenberg

In of the second decade of the twenty-first century, the United States finds itself on the cusp of what might be called the third atomic age. The first coincided with the Cold War, which saw the United States transition from a nuclear weapons monopoly to a superpower seeking to restore parity to the strategic balance in the wake of the Soviet Union's development and deployment of a massive, powerful, and extensive nuclear weapons capability.

The second atomic age emerged with the disintegration of the Soviet Union, ending the Cold War. It was characterized by a period of reassessment and restructuring of US nuclear policies and forces to adapt to a security environment that had changed dramatically and unexpectedly.

Today, a third atomic age is developing in which the role of nuclear weapons in US national security strategy continues to diminish and the nuclear forces supporting that strategy shrink to historically low levels. However, the global proliferation of nuclear weapons and technologies has led others to move in the opposite direction—seeking to acquire the very nuclear weapons that many in the West view as increasingly irrelevant to contemporary security challenges. The potential ramifications of this development have led some analysts to suggest the world is now at a nuclear "tipping point."

Throughout the Cold War and post–Cold War periods, the United States relied ultimately on its nuclear potential to deter aggression. During the Cold War, the primary mission of US nuclear forces was to deter the Soviet Union. In the early part of this era, US policy makers postulated that deterrence could be effectively maintained with a nuclear

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capability sufficient to inflict a level of damage to the Soviets' industrial capacity and population that they would deem unacceptable. This "deterrence by punishment" calculus formed the basis of force sizing and planning for the US nuclear arsenal for years to come. Yet, a central fallacy in this approach was that it relied on *American* perceptions of what the Soviets would find "unacceptable" rather than definitive knowledge of what they themselves would consider sufficient to deter.

The debate over extended deterrence is similarly challenged by a need to understand that its effectiveness depends on how both allies and adversaries perceive the credibility of US commitments. American views of how others *should* perceive the credibility of US nuclear threats are less relevant than how others *actually* perceive them. Moreover, the views of allies and adversaries can vary widely, based on historical, cultural, and other unique circumstances.

As the nature of nuclear threats evolved, the US nuclear force structure and size also evolved. With the demise of the Soviet Union, the missions and purposes of US nuclear forces were increasingly called into question. This included not only their utility for deterring direct attack on the United States but also the efficacy of extending nuclear deterrence to third parties to prevent aggression by others.

The Bush administration's 2001 *Nuclear Posture Review* (*NPR*) postulated a world of extant and emerging nuclear powers posing qualitatively different nuclear threats to the United States and its allies than existed during the Cold War. While deterrence of nuclear attack remained a central goal of US nuclear forces, its nuclear arsenal was considered to play a broader role in ensuring global security.

Along with traditional deterrence, the 2001 *NPR* articulated a role for nuclear weapons in "assurance, dissuasion, and defeat"—concepts previously posited in the 2001 *Quadrennial Defense Review*. In other words, the *NPR* acknowledged that US nuclear forces play a major role in providing security guarantees to friends and allies who lack their own nuclear weapons and face challenges from hostile neighbors or adversaries (i.e., assurance). The US nuclear potential was also seen as having a dissuasive effect on adversaries who might contemplate actions contrary to American interests. And, of course, should deterrence fail—an increasingly plausible prospect in a world of rogue states and terrorist actors—US nuclear forces must have the capacity to defeat any aggressor. Without this capacity, the

credibility of the US nuclear deterrent might be called into question, undermining the central deterrence goal of its nuclear forces.

This article focuses on the assurance aspect of US nuclear forces—helping to assure friends and allies of the American commitment to their security. There are many ways to assure friends and allies, and not all rely on threatening potential aggressors with nuclear destruction. These can include declaratory policy, creating or strengthening mutual defense agreements and military alliances, fostering broader political relationships, bolstering reliance on missile defenses, and the forward deployment of conventional forces.[1]

None of these means is mutually exclusive, and a sound policy of assurance will deploy all of them, as appropriate, tailored to specific circumstances. Nevertheless, it is the nuclear deterrence aspect of assurance which is being questioned more widely as nuclear force levels are reduced and which is the focus of this article.

Importantly, the requirements for extended deterrence and assurance may not be identical. An adversary may be deterred from attacking an ally even though that ally does not perceive its security to be adequately "assured." Therefore, in some cases, the requirements for assurance may exceed those of deterrence. Clearly, the answer to the question How much is enough (or too little)? depends on the perception of both allies and adversaries.[2]

In light of growing threats to the United States posed by the proliferation of nuclear and other weapons of mass destruction (WMD) capabilities to potential adversaries, the efficacy of security guarantees also depends on how allies perceive US willingness to defend their security if doing so risks exposing the US homeland to direct attack.

By extending its nuclear deterrent to other countries, the United States has historically provided a "nuclear umbrella" under which it sought to ensure their security. The prospect of a nuclear response by the United States to a third-party attack using nuclear or other WMDs on an ally has for decades added a degree of uncertainty to the calculations of potential adversaries contemplating such aggression. However, in a world of proliferating nuclear powers, renewed American emphasis on arms control and further nuclear reductions and growing tensions between US policies that support elimination of nuclear weapons entirely

and adversaries who increasingly seek them, the continued viability and credibility of the extended deterrent deserves closer examination.

Some questions this article addresses include:

- How has extended deterrence worked in the past, and what are the factors that influence its viability?
- Is there a link between extended deterrence and nonproliferation?
- How do allies in Europe and Asia perceive the requirements of extended deterrence?
- Is the size of the US nuclear arsenal more relevant to extended deterrence than its composition?
- Are there alternatives to the extended deterrence provided by US nuclear forces that can provide the same degree of assurance to friends and allies?
- What impact do nuclear reductions have on the ability of the United States to reassure allies of the credibility of its security guarantees?
- What are the implications for extended deterrence of current US nuclear policies?
- And, as US nuclear forces are reduced, is there some threshold level of capability beneath which the risks of aggression exceed the ability to deter it?

History of Extended Deterrence

At the dawn of the nuclear age, the United States confronted a numerically superior conventional army that had occupied the eastern half of Europe after World War II. As Cold War attitudes hardened and Soviet expansionist objectives became clearer, the United States sought to deter Soviet aggression by extending its nuclear deterrent abroad. The threat of an American nuclear response to a conventional invasion of Western Europe was integrated into US military doctrine in the postwar era.

At a time when the United States possessed nuclear superiority over the Soviet Union, this extended deterrent was perceived as a credible threat sufficient to deter any move west by the Red Army. As the Soviets approached nuclear parity and then surpassed the United States in overall levels and capabilities of its nuclear forces, the credibility of US

threats to "go nuclear" to protect Western Europe against Soviet aggression became debatable.

Nevertheless, despite changes in the balance of nuclear forces between the two superpowers in the 1960s and 1970s, the US nuclear arsenal remained sizable enough to give pause to any aggressor. At its peak, the United States deployed more than 10,000 strategic and nonstrategic (i.e., tactical) nuclear weapons on more than 2,000 delivery platforms. Although the Soviets maintained some significant advantages in nuclear firepower, throw weight, and other measures of nuclear capability, the sheer size of the American nuclear arsenal was thought by some to have an "existential" deterrent effect.[3]

As arms control became a central element of the bilateral superpower relationship, pressures emerged to reduce the size of nuclear stockpiles. Along with the Strategic Arms Limitations Talks (SALT) and Strategic Arms Reductions Talks (START), which resulted in treaties reducing the number of long-range nuclear weapons systems, the 1986 Intermediate-Range Nuclear Forces (INF) Treaty resulted for the first time in the negotiated elimination of an entire class of nuclear weapons delivery systems. This included the Pershing II ballistic and ground-launched cruise missiles (GLCM) deployed in Europe that were a visible part of the US extended deterrence commitment.

Extended deterrence was not limited to protecting European allies. For example, as Japan became one of the strongest postwar allies of the United States, the emerging nuclear weapons potential of first China and then North Korea concerned Japanese officials, who became acutely sensitive to the role of the US nuclear umbrella in assuring Japan's security.

After the Korean armistice in 1953, South Korea also enjoyed a degree of protection accorded by the American extended nuclear deterrent. US nuclear weapons were stationed on South Korean territory. The painful shadow of Vietnam, however, and the fall of the Saigon government in 1975 led to questions about whether the United States would rather accept defeat in war than resort to the use of nuclear weapons.

Since then, the United States has deployed veiled nuclear threats in limited circumstances to bolster deterrence. For example, then secretary of state James Baker articulated such a threat to Saddam Hussein in an effort to deter the Iraqi dictator from using WMDs against coalition forces in the 1991 Gulf War. Even though Secretary Baker later admitted the United

States had no intention of using nuclear weapons, the possibility they might be used was arguably a consideration in Saddam's decision not to launch chemical or biological attacks against Israel or coalition forces.

The importance of extended deterrence has been recognized even by those who favor the ultimate elimination of the nuclear capabilities on which it rests. Speaking in Prague in April 2009, President Obama reiterated his vision for a nuclear-free world but noted, "As long as these weapons exist, the United States will maintain a safe, secure, and effective arsenal to deter any adversary, *and guarantee that defense to our allies*"[4] (emphasis added). Today, however, as nuclear weapons increasingly are seen by some decision leaders as weapons that serve no purpose, will never be used in combat, and should be eliminated, the credibility of US nuclear threats is likely to be diminished in the eyes of both potential adversaries and long-time friends and allies.

The Relationship between Extended Deterrence and Nonproliferation

For a number of states, their own security rests on the viability and credibility of US nuclear assurances. Without the assurance—or reassurance—that this nuclear umbrella provides, these states may pursue their own nuclear weapons acquisition programs. As one observer noted, "For allies such as Japan, South Korea and Taiwan, and some NATO states, the stability both of the US deterrent and extended deterrence guarantees are a significant part of these countries' own strategic calculus."[5] Indeed, there have been numerous studies in recent years suggesting "the credibility and reliability of US nuclear assurances are necessary to keep countries . . . from reconsidering their decisions to be nonnuclear states."[6]

In a 2007 study that linked US extended deterrence with nonproliferation, the State Department's International Security Advisory Board (ISAB) concluded, "Nuclear umbrella security agreements, whether unilateral or multilateral, have been, and are expected to continue to be, effective deterrents to proliferation."[7] The ISAB report stated, "There is clear evidence in diplomatic channels that US assurances to include the nuclear umbrella have been, and continue to be, the single most important reason many allies have foresworn nuclear weapons," and further suggested that "a lessening of the US nuclear umbrella could

very well trigger a [nuclear proliferation] cascade in East Asia and the Middle East."[8]

Former secretary of defense Robert Gates acknowledged the importance of US nuclear weapons to extended deterrence and nonproliferation. In a 2008 speech to the Carnegie Endowment for International Peace, he declared, "As long as others have nuclear weapons, we must maintain some level of these weapons ourselves to deter potential adversaries and to reassure over two dozen allies and partners who rely on our nuclear umbrella for their security, making it unnecessary for them to develop their own."[9]

In 2009, the bipartisan Commission on the Strategic Posture of the United States concluded, "The US nuclear posture must be designed to address a very broad set of US objectives, including not just deterrence of enemies in time of crisis and war but also assurance of our allies and dissuasion of potential adversaries. Indeed, the assurance function of the force is as important as ever."[10]

By some estimates, nearly 30 countries rely on the extended deterrent for the ultimate security US nuclear forces provide. Some of these countries are strong US allies that do not feel sufficiently threatened by neighbors or adversaries to contemplate developing nuclear weapons of their own. Others have been dissuaded from doing so as a result of formal defensive alliances with the United States (such as NATO). Still others are friends with which the United States does not have a formal defense relationship but whose security is nevertheless important to the maintenance of stability and defense of American interests; therefore, the nuclear umbrella has been extended to them.

Many of these countries can be found in dangerous or unstable regions with potentially hostile neighbors. If the US extended nuclear deterrent loses credibility, it is most likely to have significant repercussions among those states who may determine that their security is best served by acquiring their own nuclear weapons capability.

Allied Views of Assurance

The role of US nuclear forces in extending deterrence to NATO allies is codified in NATO's *Strategic Concept*, promulgated in 2010. The document states, "The supreme guarantee of the security of the Allies is provided by the strategic nuclear forces of the Alliance, particularly those of the United States." In addition, NATO's strategy for deter-

rence will continue to be based "on an appropriate mix of nuclear and conventional capabilities."

What constitutes an "appropriate mix" is a matter to be determined by the NATO members themselves. However, the *Strategic Concept* notes, "As long as nuclear weapons exist, NATO will remain a nuclear alliance." Further, the document is clear on the inseparability of European and American security, noting that "the transatlantic link remains as strong, and as important to the preservation of Euro-Atlantic peace and security, as ever."[11]

The issue of extended deterrence and the role of US nuclear forces in providing that deterrence to NATO is not without controversy. Nevertheless, it is clear a number of US, NATO, and non-NATO allies consider the US extended deterrent to be critical to their security.[12] A group including former military chiefs of the United States, Britain, France, Germany, and the Netherlands reaffirmed the importance of the extended deterrent role of US nuclear forces and the credibility of nuclear escalatory threats by noting, "The first use of nuclear weapons must remain in the quiver of escalation as the ultimate instrument to prevent the use of weapons of mass destruction, in order to avoid truly existential dangers."[13]

For some, the value of the extended deterrent lies in the deployment of American nuclear weapons on their territory and the demonstration of resolve these deployments convey. In these cases, additional US strategic offensive arms reductions may have less significance on allied perceptions of American credibility. For others, the value of extended deterrence lies more in the ability and willingness of the United States to maintain the effectiveness of its strategic nuclear arsenal. Therefore, additional strategic arms reductions may undermine the assurance value of American security guarantees.

In the past, some US allies have expressed strong views regarding the extended deterrent. These include non-NATO allies. For example, according to documents recently declassified by Japanese officials, concern over a possible Sino-US conflict in the mid 1960s led Prime Minister Sato Eisaku to press Secretary of Defense Robert McNamara for assurances the United States would be prepared to use its nuclear weapons against China.

In the wake of China's nuclear testing, Secretary McNamara subsequently expressed concern that without reassuring Japan of the US com-

mitment to its security, Tokyo might seek its own nuclear weapons. Since then, other Japanese officials have sought similar American nuclear assurances, including comments by Foreign Minister Aso Taro after North Korea's nuclear test in 2006.[14] Apparently, South Korea also sought nuclear assurances from the United States after that nuclear test.[15] Former South Korean defense ministers reportedly approached the United States seeking the redeployment of nuclear weapons in South Korea that had been previously withdrawn.[16]

In June 2009, President Obama and South Korean president Lee Myung-bak reaffirmed that the US–Republic of Korea security relationship included the "continuing commitment of extended deterrence, including the US nuclear umbrella."[17] During a subsequent visit to Seoul, Secretary of Defense Gates declared, "The United States is committed to providing extended deterrence using the full range of American military might" to protect South Korea, including "the nuclear umbrella."[18]

Obviously, allied views of extended deterrence will be shaped not only by what the United States does with respect to its nuclear forces but also by the evolving global strategic situation. Although the Cold War division of Europe ended more than two decades ago, some allies in Europe grow increasingly concerned over what they perceive as a renewed aggressiveness in Russia's foreign and defense policies. The Russian military action in the summer of 2008 against Georgia—a country seeking NATO membership—suggested that extending US nuclear guarantees to countries on Russia's periphery might be risky business. It also raised additional uncertainties on the part of Russia's other neighbors regarding the credibility of US security guarantees.

On top of this, Russia has revised its military doctrine to place increased reliance on its nuclear forces, continued to pursue an aggressive nuclear weapons modernization program, resumed Cold War–style exercises of its strategic nuclear forces, threatened some of its former satellite states with nuclear attack, and publicly proposed developing new "offensive weapons systems" to counter the United States.[19]

In the wake of Russian statements and actions, the concerns of Russia's neighbors and their desire to be integrated into the security perimeter of the United States are understandable. So, too, is concern that Washington's desire to "reset" its relationship with Moscow in the wake of Russia's increasing assertiveness may actually lead others to question the attractiveness of, and confidence in, American security guarantees.

Ukraine, a former Soviet state, has been wary of Russia and, until recently, sought the security guarantees that would accrue to it from NATO membership. Yet, after 2010, the new Ukrainian government changed course from its predecessor, declaring Kiev's preference for neutrality and nonalignment, rejecting the previous government's push for NATO membership, and seeking greater accommodation with Russia.[20]

As more countries pursue the path to NATO membership, the United States will likely find itself extending its nuclear umbrella to additional states in what was formerly viewed as Russia's "sphere of influence." Future reductions in European-based US tactical nuclear forces, along with NATO's prior assurances to Russia that new NATO members would not host US nuclear weapons on their territories,[21] may complicate the mission of extended deterrence. Indeed, when coupled with the movement toward significant reductions in US strategic nuclear forces, it may become increasingly difficult to explain credibly how nuclear deterrence can be effectively extended to a greater number of states at a lower level of forces.

In Asia, the developing nuclear capabilities of North Korea have also sparked concern among America's regional friends and allies. Japan, in particular, has encouraged the United States not to back away from its extended nuclear deterrent. After North Korea's 2006 nuclear test, one Japanese press report stated that "Defense Minister Fumio Kyuma spoke in no uncertain terms about strengthening the deterrence of US nuclear weapons. The strongest deterrence would be when the United States explicitly says, 'If you drop one nuclear bomb on Japan, the United States will retaliate by dropping 10 on you,' he said."[22]

Japan has been particularly sensitive over the credibility of US security guarantees. Japan's 2004 Defense Program Outline declared, "To protect its territory and people against the threat of nuclear weapons, Japan will continue to rely on the US nuclear deterrent," a posture explicitly reflected in the country's official Defense Program Outline since 1976.[23] The "National Defense Program Outline for Fiscal [Year] 2011 and Beyond" reportedly emphasizes that "extended deterrence provided by the United States, with nuclear deterrence as a vital element, will be indispensable."[24] A US-Japan joint statement issued after a meeting of the bilateral Security Consultative Committee in May 2007 reaffirmed that "US extended deterrence underpins the defense of Japan and regional security," and this

includes "the full range of US military capabilities—both nuclear and nonnuclear strike forces and defensive capabilities."[25]

Yukio Satoh, vice-chairman of the Japan Institute of International Affairs and former diplomat, expressed Japan's views regarding US extended deterrence by noting:

> The importance for Japan of the American nuclear deterrence has increased since the end of the Cold War, as the country has become exposed to a diversity of conceivable nuclear threats, such as North Korea's progressing nuclear and missile programs, China's growing military power, and Russia's strategic reassertiveness. These developments are making Japan increasingly vulnerable to possible or potential threats by nuclear and other weapons of mass destruction (WMD). Ensuring American commitment to extend deterrence against such threats is therefore a matter of primary strategic importance for Japan. . . .
>
> In recent years, the Japanese have become growingly sensitive to the credibility of the American commitment. Exposed to a series of dangerous actions by Pyongyang, particularly its test-shooting of a missile over Japan in 1998, its nuclear testing in 2006, and yet another test of a long-range missile, the Japanese have come to realize anew the importance of the American extended deterrence for their security, and this has made the Japanese more sensitive than ever to Washington's attitude to North Korea.[26]

Ambassador Satoh, a supporter of the "Global Zero" movement to eliminate nuclear weapons, also recognized the potential hazards the move toward nuclear disarmament could pose for Japanese security, noting,

> Even the propositions advocated by eminent American strategists to pursue "a world free of nuclear weapons" have given rise to some anxiety about the possible negative impact on the American extended deterrence. . . . Furthermore, the Japanese concern about the credibility of the American extended deterrence could increase if the US government were to unilaterally move to redefine the concept of nuclear deterrence, particularly to reduce dependence upon nuclear weapons in providing deterrence, without proper consultations. . . .
>
> There have been no official consultations between Washington and Tokyo on how American extended deterrence should function, nor even any mechanism put in place for such consultations. . . . The time has come for us to create some kind of mechanism through which we can discuss the common strategy, particularly if the United States is going to reduce dependence upon nuclear weapons in their strategy.[27]

Does Size Matter?

Assurance considerations may be affected not only by the size of the American extended nuclear deterrent but also by its composition. Some countries may not consider additional numerical reductions in US strategic nuclear forces to be especially significant with respect to the credibility of security guarantees unless those reductions impact the levels or operational utility of the types of nuclear forces those countries consider most useful to deter threats to their security.

For example, the threatened use of land-based ICBMs deployed on American soil in defense of allies may be seen as less credible than SLBMs on submarines that can deploy to crisis areas, especially since a strike using forces based in the United States may increase the risk of direct retaliation against the US homeland. For this reason, allies may consider the United States less willing to come to their defense by employing its central strategic forces. Bombers, however, may provide the highest level of reassurance to allies since, unlike ICBMs, they are mobile and, unlike nuclear ballistic missile–armed submarines (SSBN), they are visible. The bomber leg of the strategic triad is the most flexible for signaling intentions, which can provide reassurance to allies in times of crisis.

The overall level of US strategic nuclear forces may convey to allies a sense of how the United States views the relevance of these forces in the contemporary security environment. Strategic force reductions pursued, for example, as part of a bilateral US-Russia effort to diminish reliance on nuclear weapons for strategic deterrence purposes may have unintended negative consequences for assurance and extended deterrence.

The Role of Strategic and Nonstrategic Nuclear Forces in Extended Deterrence

Discussions of "strategic" and "nonstrategic" nuclear forces tend to obscure the fact that for the countries whose security depends on them, all nuclear weapons are strategic. The distinction is somewhat artificial and was derived to conform to an arms-control process that focused on regulating arsenals based on the range of their delivery systems. Nevertheless, both longer-range and shorter-range systems have relevance for extended deterrence.

Today, the United States maintains a minimum number of nonstrategic nuclear weapons in Europe. Most European-based US nuclear forces

were removed as a result of the 1986 INF Treaty, which eliminated the Pershing II missile and GLCMs, or the 1991 Presidential Nuclear Initiative (PNI), which led to the withdrawal of nuclear artillery shells, naval anti-submarine nuclear weapons, and short-range ballistic missile nuclear warheads.[28] In 1971, 11 types of nuclear weapons systems were deployed in Europe.[29] Today, the number of nonstrategic nuclear weapons in NATO Europe has been reduced by more than 97 percent from 1970 levels. The only remaining US nuclear weapons in Europe are air-delivered gravity bombs that reportedly can be deployed on dual-capable aircraft in Turkey, Italy, Germany, Belgium, and the Netherlands. Deployment of these nonstrategic nuclear weapons has always been seen as a means of reinforcing America's extended nuclear deterrent by providing a critical link between conventional forces in Europe and US strategic nuclear forces. They have also provided a visible and tangible expression of American solidarity with host countries, which some believe has strengthened their deterrent value.

The importance of maintaining US nonstrategic nuclear forces in Europe was highlighted in a 2008 report by the Secretary of Defense Task Force on DoD Nuclear Weapons Management, which noted,

> The Allies believe in the US nuclear deterrent as a pillar of the Alliance. Some Allies have been troubled to learn that during the last decade some senior US military leaders have advocated for the unilateral removal of US nuclear weapons from Europe.
>
> These Allies are convinced that the security of the United States is "coupled" to that of Europe. Moreover, these allies are aware of the greater symbolic and political value of allied aircraft employing US nuclear weapons. . . .
>
> USEUCOM (US European Command) argues that an "over the horizon" strategic capability is just as credible. It believes there is no military downside to the unilateral withdrawal of nuclear weapons from Europe. This attitude fails to comprehend—and therefore undermines—the political value our friends and allies place on these weapons, the political costs of withdrawal, and the psychological impact of their visible presence as well as the security linkages they provide. . . .
>
> DCA (dual-capable aircraft) fighters and nuclear weapons are visible, capable, recallable, reusable, and flexible and are a military statement of NATO and US political will. These NATO forces provide a number of advantages to the Alliance that go far beyond USEUCOM's narrow perception of their military utility. Nuclear weapons in Europe provide a continuous deterrence element; as long as our allies value their political contribution, the United States is obligated to provide and maintain the nuclear weapon capability.[30]

Should these forces be withdrawn completely, the willingness of the United States to "go nuclear" on Europe's behalf could be called into question. It could also place increasing stress on US strategic nuclear forces by adding additional mission responsibilities (especially if the number of countries protected under the nuclear umbrella continues to increase as a result of NATO enlargement) at a time when those forces are also likely to decline further.

It is plausible the requirements of extended deterrence may also necessitate the retention of certain types of nuclear forces that might otherwise be withdrawn or retired. As the Congressional Commission on the Strategic Posture of the United States noted, "Assurance [of allies] that extended deterrence remains credible and effective may require that the United States retain numbers or types of nuclear capabilities that it might not deem necessary if it were concerned only with its own defense."[31] The commission also reported some European allies believe modernization of European-based nuclear forces is "essential to prevent nuclear coercion by Moscow" and for "restoring a sense of balance" in the face of Russia's nuclear modernization efforts.[32] In addition, Turkey has reportedly been concerned over the potential removal of nuclear gravity bombs that can be carried by dual-capable aircraft based on its territory. In August 2009, Turkish officials reportedly expressed concern that Iran's efforts to acquire nuclear weapons would lead Turkey to do the same.[33]

Some Asian officials have expressed particular concern over the potential elimination of the TLAM-N cruise missile, one of the few nonstrategic nuclear weapons remaining in the US nuclear arsenal. This was noted by the congressional commission.[34] One account of concerns expressed by a "particularly important ally" indicated that should the United States decide to eliminate TLAM-N, "we would like to be consulted in advance with regard to how the loss of this capability for extended deterrence will be offset."[35] Additionally, the commission noted the views of one ally, expressed privately, that "the credibility of the US extended deterrent depends on its specific capabilities to hold a wide variety of targets at risk, and to deploy forces in a way that is either visible or stealthy, as circumstances may demand."[36]

Some analysts have suggested that the TLAM-N has little military utility and its importance to countries like Japan is overstated. One challenged the Strategic Posture Commission's conclusions in this regard,

calling the notion that TLAM-N is critical to extended deterrence in Asia "odd."[37] In particular, the deployment of other capabilities to the Pacific region, including aircraft carriers, submarines, and long-range bombers, is seen by some as a sufficient deterrent to aggression.

As one analyst noted, "Why, given these extensive US forces earmarked for the Pacific region, anyone in Tokyo, Washington, Beijing, or Pyongyang would doubt the US capability to project a nuclear umbrella over Japan—or see the TLAM-N as essential—is puzzling."[38] Such reasoning, however, reflects a decidedly *American* perspective based on *American* views of what *should* be reassuring to allies. But clearly, reassurance is in the eye of the reassured, and allied views may differ from ours, based on unique historical, cultural, or other factors. These factors should be taken into account if the purpose of the US extended deterrent is to reassure allies of the US commitment to their security.

Since the change in Japan's government in 2009, questions have been raised about that country's views of the importance of the TLAM-N for extended deterrence. Japan's former foreign minister Katsuya Okada noted, "The Japanese government is not in a position to judge whether it is necessary or desirable for [the US] government to possess particular [weapons] systems. . . . Nevertheless, if TLAM-N is retired, we hope to receive ongoing explanations of [the US] government's extended deterrence policy, including any impact this might have on extended deterrence for Japan and how this could be supplemented."[39]

Indeed, as articulated in the 2010 *Nuclear Posture Review Report*, the Obama administration decided to retire the TLAM-N, arguing that it "serves a redundant purpose in the US nuclear stockpile," and its deterrence and assurance roles "can be adequately substituted" by other means, including forward-deployed aircraft and central strategic forces.[40] Consequently, all TLAM-N missiles are expected to be retired by 2013. At the same time, however, the administration has declared "no changes to US extended deterrence capabilities will be made without continued close consultation with allies and partners."[41]

With respect to the continued deployment of nonstrategic nuclear forces in Europe, the Obama administration's April 2010 *Nuclear Posture Review Report* argues such decisions should be made in consultation with NATO allies and says the United States "is committed to making consensus decisions through NATO processes."[42] Moreover, it declares, "Any

changes in NATO's nuclear posture should only be taken after a thorough review within—and decision by—the Alliance."[43]

Despite the expressed US commitment to consult closely with countries that benefit from its extended deterrent, some observers have argued the views of allies should not drive the United States to maintain nuclear weapons that have little military utility. They argue that doing so would essentially hold American nuclear deployments "hostage" to the whims of other countries.[44] Nevertheless, it is clear American strategic interests are best served by considering allied views—though these views may not be determinative—prior to any future decisions regarding the appropriate level or composition of US nuclear forces.

Although a number of European and Asian allies share similar views of the importance of extended deterrence, there are also important nuances. For example, European allies in general put great value in the deployment of US nonstrategic nuclear weapons on European soil, whereas a number of Asian allies would prefer to keep US nuclear weapons, both strategic and nonstrategic, "on call."[45]

Extending Deterrence by Other Means

Extended nuclear deterrence worked well during the Cold War. NATO's deployment of US nuclear weapons on European soil, coupled with its refusal to preclude the first use of nuclear weapons in response to Soviet conventional aggression, arguably helped convince Soviet leaders of the seriousness of America's nuclear guarantees to its European allies. In the post–Cold War world, however, some have questioned the value of extended deterrence, suggesting other alternatives can deliver the deterrent value US nuclear forces once provided.

Third-Party Nuclear Capabilities

In the European context, both the UK and France maintain their own independent nuclear forces and could presumably extend their nuclear deterrent to the rest of Europe. However, neither country is likely to do so for a variety of political and strategic reasons. These include the difficulty of persuading their populations to use their independent nuclear deterrents not only to protect their own citizens but other European countries as well, especially in a post–Cold War world where pressures to reduce reliance on nuclear forces continue to mount.

UK strategic policy continues to reflect the need for nuclear deterrence, albeit at lower force levels, and recognition that British nuclear weapons can play an important role in NATO's collective security. *The Strategic Defence and Security Review* submitted by Prime Minister David Cameron to Parliament in October 2010 declares that the United Kingdom "can meet the minimum requirement of an effective and credible level of deterrence with a smaller nuclear weapons capability." To this end, the UK plans to "reduce our requirement for operationally available warheads from fewer than 160 to no more than 120."[46]

The British government's 2006 white paper recognized its nuclear forces have been reduced by 75 percent since the end of the Cold War.[47] Former prime minister Gordon Brown, in a July 2009 report to Parliament, noted a "minimum nuclear deterrent remains an essential element of our national security" and declared Britain "will continue to contribute our strategic nuclear deterrent to NATO's collective security," but added that the UK "would only consider using nuclear weapons in self-defense (including the defense of our NATO allies), and even then only in extreme circumstances."[48] This was reaffirmed by the 2010 *Strategic Defence and Security Review*, which stated, "The U.K. has long been clear that we would only consider using our nuclear weapons in extreme circumstances of self-defence, including the defence of our NATO Allies, and we remain deliberately ambiguous about precisely when, how, and at what scale we would contemplate their use."[49]

In his 2006 speech to the Strategic Air and Maritime Forces at Ile Longue, President Jacques Chirac reiterated the importance of France's nuclear deterrent, calling it "the ultimate guarantor of our security," and declared there should be no doubt "about our determination and capacity to resort to our nuclear weapons. The credible threat of their utilization permanently hangs over those leaders who harbor hostile intentions against us." But he also suggested defending France's vital interests could extend beyond the country's borders as a result of "the growing interdependence of European countries and also by the impact of globalization."

Chirac noted, "Safeguarding our strategic supplies or the defense of allied countries are, among others, interests that must be protected." He also declared France's nuclear deterrent to be "a core element in the security of the European continent."[50] Nevertheless, this statement was offered in the context of a NATO defense framework that continues to

rely on American nuclear capabilities for extended deterrence. It was not meant to suggest French nuclear forces could substitute for American capabilities. Moreover, some European countries have in the past been disinclined to stake their own security on France's nuclear deterrent.[51] This may, in part, reflect political as well as military concerns.

As a practical matter, extending deterrence to European allies through exclusive reliance on the relatively small UK or French nuclear deterrents is unlikely to convey the same measure of credibility as using US nuclear forces. In addition, neither the British nor French nuclear capabilities are seen as sufficient to extend deterrence to Asian allies against a growing Chinese nuclear capability.[52]

Nonnuclear Capabilities

Some believe the contemporary strategic environment no longer requires American nuclear threats to be made on behalf of allies, if it ever did, and nonnuclear means can be equally effective as a deterrent to aggression. As a 2008 RAND paper argued, "The United States, even when resting extended deterrence almost entirely on nuclear weapons, was always extremely circumspect about even obliquely threatening their use; this was no less the case during the 1950s when it still retained a near monopoly on long-range nuclear weapons. At present, and for the near term, US conventional capabilities greatly reduce the need to rely on nuclear weapons for extended deterrence relative to the 1950s."[53]

Nuclear weapons deter by threatening severe punishment to a potential attacker. The effectiveness of this type of deterrence requires the ability to hold at risk those assets an adversary values most. Although in certain cases modern conventional weapons can accomplish military objectives once thought possible only by the use of nuclear weapons, they cannot substitute for nuclear weapons in all cases.

For example, potential adversaries like North Korea and Iran have placed their most valuable strategic assets underground, in highly protected areas, beyond the reach of conventional strike capabilities. Removing the threat of a nuclear retaliatory strike would grant sanctuary to those assets or capabilities that could no longer be held at risk. Rather than deter aggression, this might provoke it if an adversary believes its most valuable assets could be spared from destruction. Some of the bloodiest conflicts in history, including two conventional world wars, were fought as a consequence of the failure of prenuclear deterrence. In

the words of one analyst, "The historical record of conventional deterrence is not encouraging."[54]

One reason to question the ability of conventional forces to substitute for nuclear in providing extended deterrence is that sufficient conventional forces may not be forward deployed in time to regions where they can function as an effective deterrent. Moreover, while the United States continues to seek a prompt global strike capability using nonnuclear weapons, those potential systems are not sufficiently mature to expect they can credibly serve the extended deterrence function that nuclear weapons do today.

In addition to the strictly military aspects of deterrence, psychological ones are at play as well. Nuclear weapons are perceived to be the ultimate weapons, and the punishment they can exact is without equal. The psychological impact of a threat to employ a weapon with such significant damage potential may, in and of itself, bolster deterrence in ways the threat of conventional retaliation could not.

While the effectiveness of deterrence rests on the adversary's perception of the consequences of aggression and it is impossible to know with absolute certainty how an adversary perceives nuclear threats, it is nevertheless plausible that conventional deterrence alone will carry less impact than deterrent threats that include a nuclear component. As Gen Kevin Chilton, former commander of US Strategic Command, testified in 2010, "The nuclear weapon has a deterrent factor that far exceeds a conventional threat."[55]

Aside from reliance on nonnuclear weapons capabilities, it is possible that extended deterrence can be bolstered through a more robust American presence on allied territory. This can take the form of troop deployments, military facilities, or other types of visible linkages that bind friends and allies more tightly to the United States. However, the very visibility of an expanded American presence on the territories of sovereign states may also occasion negative political repercussions, especially in times of heightened tensions. Hence, the value of this means of assurance may be more susceptible to short-term fluctuations in internal host-nation politics that impact the credibility of American security guarantees.

Missile Defenses

In addition to the threat of punishment, deterrence can also be achieved through the ability to deny a potential attacker the objectives of its attack. This "deterrence through denial" strategy can be reflected in defensive measures—either as a substitute for or adjunct to—offensive retaliatory means.

The 2001 *NPR* reintroduced defenses into the calculus of deterrence by advocating the deployment of ballistic missile defenses. The ability to protect and defend against attack should deterrence fail was seen as a critical element of a sound nuclear strategy and a policy that reinforced deterrence by complementing the offensive threat of "punishment" with a defensive strategy of "denial." By adding strategic defenses to the deterrent mix, the 2001 *NPR* argued reliance on nuclear weapons could be reduced. This did not mean, however, that it could be eliminated entirely.

Ultimately, an adversary decides what best deters it from a particular course of action. For some aggressors, the threat of denial may be less of a deterrent than the threat of punishment. But it is impossible to know with certainty what will work best in all circumstances and under all scenarios. Therefore, a prudent strategic posture should seek to maximize the effectiveness of deterrence by maintaining the capability to both punish and deny. Like advanced conventional weapons, missile defenses can be an important adjunct to a deterrence policy that includes nuclear weapons, but defenses alone cannot substitute for them.

Robustness of the Nuclear Enterprise

Regardless of whether nuclear deterrence relies on offensive punitive measures, defensive systems, or a combination of both, the capabilities to punish or deny must be viewed as credible to be effective. In large measure, the credibility of a nuclear deterrent arsenal lies not only in a willingness to employ it if necessary but in its perceived reliability—its ability to accomplish its mission if employed.

As the United States continues to abide by the unilateral nuclear test moratorium imposed two decades ago and as its nuclear arsenal continues to age, there has been a rising chorus of concern over the continued reliability and efficacy of that arsenal. Some observers have suggested American decisions over nuclear weapons modernization and sustain-

ment of the US nuclear weapons enterprise have consequences for extended deterrence. While acknowledging the importance of the actual nuclear weapons in ensuring deterrence, viability of the nuclear weapons complex is also seen as central to ensuring deterrence.

As two Los Alamos National Laboratory officials put it, "It is not only the capabilities of the forces themselves that assure allies and deter potential adversaries, it is also the capability to sustain and modernize these forces, while also demonstrating that ability to rapidly respond to new or emerging threats."[56] This suggests a failure to modernize and adapt the US nuclear infrastructure to contemporary security threats may cast doubt on the credibility of the US extended deterrent.

A similar point was made in a study of extended deterrence published by the Center for Strategic and International Studies, which noted that

> perceived challenges to the credibility of US deterrence capabilities in the long term could have shorter-term consequences for assurance. Perceptions of the long-term viability of the US stockpile and infrastructure and of the prospects for a national consensus on the future of the US deterrent are salient factors affecting allies' confidence in the durability of the US commitment. Allies are paying close attention to American nuclear policy debates. Arguments from both sides of the ideological divide can undermine assurance by skewing allies' perceptions of US intentions and capabilities.[57]

There is also some evidence to suggest European allies view the continued viability of the overall US nuclear enterprise to be more relevant to extended deterrence than either the levels or composition of US nuclear forces.[58] Indeed, the significant decline in the US strategic nuclear arsenal since the height of the Cold War, the removal of almost all nonstrategic nuclear forces in Europe, the suspension of underground nuclear testing, the loss of nuclear design and engineering competence and talent in the national laboratories, the congressional prohibitions on nuclear modernization, the aversion to any "new" nuclear weapons, and the general lack of attention to nuclear matters are symptomatic of a trend that suggests a diminished overall utility for nuclear weapons. These developments may also suggest to allies there is reason for additional concern over the efficacy of America's extended deterrent.

The Impact of the Obama Administration's Nuclear Policies

The Obama administration has made the global elimination of nuclear weapons a key national security goal. In the same Prague speech in which he reiterated the importance of extending nuclear deterrence to US allies, President Obama also declared the United States—as the only nation to have used nuclear weapons in anger—has a "moral responsibility" to work for their elimination. One year later, the president signed a "New START" treaty with Russia that would reduce the level of strategic nuclear offensive forces—both warheads and their associated delivery vehicles—to levels below those agreed to in the 2002 Strategic Offensive Reductions Treaty (i.e., the Moscow Treaty). In addition, he committed the administration to pursuing significantly lower levels of nuclear forces as part of a follow-on arms control agenda with Russia.

Subsequent to the signing of New START, the administration released its own nuclear posture review. This new, congressionally mandated NPR articulated the rationale and provided the underpinning for decisions that will affect the size and composition of the American nuclear arsenal over the next decade.

As expected, the 2010 *NPR* reaffirmed the importance of extended deterrence, noting, "The United States remains committed to providing a credible extended deterrence posture and capabilities."[59] And it suggested a role for US central strategic forces in the extended deterrence mission. In particular, it stated that "nuclear-capable bombers are important to extended deterrence of potential attacks on US allies and partners. Unlike ICBMs and SLBMs, heavy bombers can be visibly forward deployed, thereby signaling US resolve and commitment in crisis."[60]

The 2010 *NPR*'s recognition of the role US central strategic forces can play in extending deterrence to allies and strategic partners raises the prospect that the demands on US nuclear forces may grow beyond the ability to meet them. This includes the possible extension of US nuclear guarantees to countries that heretofore have remained outside the formal protection of the US nuclear umbrella. In November 2008 it was reported the United States might extend an explicit nuclear guarantee to Israel in the event Iran acquired nuclear weapons.[61]

In July 2009, Secretary of State Hillary Clinton appeared to broaden that guarantee by stating the United States might consider extending

"a defense umbrella" over the Middle East region as a deterrent to a nuclear-armed Iran.[62] Although she did not explicitly refer to an extended nuclear deterrent, the implication was clear and was seen as an attempt to dissuade countries in the region such as Saudi Arabia and other Gulf states from seeking nuclear weapons as a counterbalance to Iran's nuclear weapons potential.

It seems odd at a time when its nuclear forces are declining, the United States may consider extending its nuclear deterrent to other non-NATO states with which it has no formal alliances. The prospect of a nuclear-armed Iran has raised concerns among its immediate and regional neighbors. Countries like Saudi Arabia may feel threatened by a nuclear weapon in the hands of the leaders of the Islamic Republic.[63] A heightened level of insecurity among countries in this volatile region may propel some toward acquisition of their own indigenous nuclear weapons capability. Such a prospect would not only be a setback to US nonproliferation policy, but also could ignite regional tensions that threaten American friends and interests.

Seeking an Appropriate Nuclear Threshold

Global strategic developments and US policy may move the United States in a potentially risky direction. The proliferation of nuclear weapons and technologies to dangerous actors is creating conditions where US allies and friends place greater stresses on, and increasingly question the credibility of, American security guarantees. For example,

- Additional European states seek security against a resurgent Russia through NATO membership that conveys the protection of the American nuclear umbrella;
- US allies in Asia are wary of China's nuclear modernization programs, as it increasingly invests in developing regional nuclear capabilities;
- North Korea's development of nuclear weapons continues unabated, fueling concerns over how the United States will ensure regional security; and
- Iran's determined pursuit of nuclear weapons may lead Middle Eastern countries—some of whom do not even get along with one another—to quietly solicit American protection.

In all of these circumstances, the extended deterrent provided by US nuclear weapons may assume greater prominence and importance. Yet, the US nuclear arsenal has shrunk to its lowest levels since the Eisenhower administration and is slated to be reduced even further, consistent with a policy whose stated objective is the complete elimination of nuclear weapons. It may be difficult to convince those who today see their own security guaranteed by the American nuclear umbrella and those who believe their future security depends upon tying themselves more tightly to the safety provided by US nuclear weapons that the shift toward other measures of assurance (e.g., advanced conventional capabilities, missile defenses, etc.) is not merely an attempt to justify policy decisions made in the absence of allied consultation and without sufficient understanding of the allies' perceptions of their own vulnerabilities.

As the number of strategic nuclear weapons and delivery platforms declines, burdens on the residual nuclear forces for implementing extended deterrence will rise. These burdens are unlikely to diminish, given the strategic realities noted above. A decline in its strategic nuclear forces may also impact the ability of the United States to forward deploy such forces to theaters of crisis. For example, although it may be seen as useful to forward deploy strategic bombers or submarines to the Pacific region as a signal of resolve, pressures to reduce these forces significantly—or even to abandon the traditional triad and move to a "dyad" or "monad"—may mitigate against such deployments and diminish the credibility of extended deterrence in the eyes of allies, friends, and adversaries.

In Europe, the future disposition of remaining US nuclear forces will likely be addressed in an alliance-wide context. Though NATO publics are generally receptive to the goal of nuclear disarmament, their governments may be increasingly reluctant to abandon those remaining US nuclear weapons on European soil in light of the alliance's enlargement, growing concerns over Russian policy and behavior directed against its neighbors to the west, and the traditionally anemic defense investment of individual NATO countries that prefer the United States continue to assume the lion's share of the burden for their ultimate security. Having suffered the consequences of a failed conventional deterrence that led to two world wars on the continent, Europeans may not yet be ready to abandon the implements of deterrence that have successfully prevented a third for more than six decades.

Any changes to America's strategic nuclear posture should not occur in the absence of detailed, robust consultations with allies and friends. Such consultations will be easier to implement with European allies, as mechanisms have long existed to involve NATO governments in the nuclear planning process. The modalities for adapting this consultative process to Asian allies and friends is more complex, however, as they have not been integrated into US nuclear planning activities in the same way as NATO countries.

How Little Is Too Little?

Deterrence is an art, not a science. Therefore, it is not possible to declare with certainty that a particular level of nuclear weapons is sufficient to guarantee the effective functioning of deterrence—or extended deterrence—in all cases, at all times, against all possible adversaries. Indeed, what may be considered sufficient for deterrence today may prove insufficient tomorrow, as the strategic environment is highly dynamic.[64]

In the past, assurance considerations have factored into decisions regarding the overall size of the US strategic nuclear arsenal. This was certainly true with respect to the strategic force reductions postulated in the 2001 *NPR*. Consistent with its guidance, US strategic forces were reduced to their lowest levels in many decades. Despite these reductions, however, the range of 1,700–2,200 operationally deployed strategic nuclear weapons subsequently codified in the Moscow Treaty was chosen as "an assurance-related requirement for US nuclear forces that they be judged second to none."[65]

To date, there has been no explanation of whether or how the reduced nuclear force levels of 1,550 warheads on 700 deployed delivery systems agreed to in the April 2010 New START accord have incorporated the assurance requirements of allies. The reductions required by New START, coupled with the Obama administration's declared intent to reduce US nuclear weapons even further on a path toward eventual elimination, may complicate the long-term viability of extended deterrence. One observer noted, "As numbers go down, extended deterrence concerns go up."[66]

Assuming continued reductions in US strategic nuclear forces, is there a threshold level beneath which the risks of aggression exceed the nation's ability to deter it? There can be no definitive answer to this question, as the answer will vary depending upon the specifics of the sce-

nario postulated. However, the ultimate answer to this question depends primarily on the perceptions of allies and adversaries, not on American calculations and theories.

Likewise, it is difficult to ascertain the appropriate level of forward-deployed nonstrategic nuclear forces necessary to ensure the continued credibility of extended deterrence. For Europe, NATO will need to address this in the context of shifting perceptions of threats, alliance membership changes, and unique national circumstances.[67] In some cases, allies may feel extending a purely defensive umbrella (e.g., through deployment of active missile defenses on their territory), hosting the deployment of US troops, or other measures may provide sufficient deterrence against aggression from hostile neighbors or powers. Yet, this is an untestable proposition. Deterrence may succeed, but it is not possible to know with absolute certainty what accounted for its success. On the other hand, if it fails we will know with certainty that the measures we relied upon were insufficient.

Preserving the credibility of US security guarantees will always be challenging. Some of the difficulties were noted by two Lithuanian analysts who argued that

> security guarantees from third nations always suffer from credibility problem [*sic*]. History provides many examples when extended deterrence fails (e.g., British and French security guarantees did not deter Germany from attacking Poland in 1939). Extended *nuclear* deterrence is even more difficult to implement. For the United States, the United Kingdom or France to prove to other nations that they are ready to risk nuclear holocaust for the sake of the Baltic states is extremely difficult.[68]

Indeed, on whose behalf the United States should risk "nuclear holocaust" is a matter of considerable dispute. Some argue it should not extend its nuclear umbrella to countries that do not share its fundamental values. Others believe American nuclear security guarantees should only be extended to countries whose security is considered absolutely vital to US survival.

If, how, and to whom the United States should extend additional nuclear guarantees should be carefully considered. As the nuclear umbrella shrinks and the number of countries seeking protection under it grows, the implications for credible extended deterrence loom large. The benefits for deterrence must be balanced against the potential risks to the United States should it fail. This is not an easy task, and there are no

simple answers. But decisions on whether to extend US nuclear deterrence to other states should be decided on a case-by-case basis, taking a range of country-specific and alliance-specific military, political, diplomatic, and other variables into account.

Despite these challenges, it is clear from the statements of some allies that reliance on the US extended deterrent is more important than ever, especially in light of changes in the strategic environment they perceive as directly threatening their security. It is also evident additional reductions to US nuclear forces may have negative consequences for the ability to assure allies that the United States is unwavering in its commitment to their security.

Conclusions

Extended nuclear deterrence has a long and relatively successful history. But most of that history was written during the Cold War under strategic circumstances that have been fundamentally altered. The demise of the Soviet Union, the rise of other nuclear-armed states, the proliferation of nuclear threats, the restructuring of alliances, and continued downward pressures on nuclear weapons and force levels suggest that extended deterrence, to be effective, must operate in new and challenging conditions.

Despite this new strategic environment, extended deterrence remains an important element of US security strategy. Its continued relevance has been recognized by the Obama administration through the statements of senior spokespersons like the secretary of state, secretary of defense, and the president himself. It has also been reaffirmed in the 2010 *NPR*. Yet, the credibility of the US nuclear umbrella may be strained as a result of the desire to rid the world of those weapons upon which it is based. Simultaneously, the number of states seeking or obtaining the protection offered by the extended deterrent may increase as the size of nuclear forces providing that extended deterrent diminishes.

Determinations of the appropriate size and composition of the US nuclear arsenal must necessarily reflect the varied requirements of extended deterrence and assurance. Given the emergence of new threats, different regional security environments, and continuing challenges to reliance on nuclear weapons for deterrence purposes, it is not possible to posit with certainty a static level of nuclear forces that can simultaneously accomplish all necessary missions. However, it does appear

plausible US nuclear force reductions will complicate achieving these missions. For this reason, future decisions regarding the size and composition of US nuclear forces should be informed by comprehensive consultations with friends and allies whose security depends on the viability of the US nuclear deterrent. Integrating allies into the formal consultative process on these issues may also have the attendant benefit of providing a form of reassurance. Absent such consultations, US policies intended to strengthen deterrence may actually hasten its failure. The consequences of such could be unprecedented and catastrophic for all. SSQ

Notes

1. For a more detailed examination of options for providing assurance, see "Nuclear Guarantees, Extended Deterrence, and the Assurance of Allies," in *Planning the Future U.S. Nuclear Force*, Vol. 2, *Foundation Report* (Washington: National Institute for Public Policy, October 2009), 55–58.

2. Indeed, during the Cold War some postulated that strengthening deterrence of the Soviet Union by deploying additional nuclear forces in Europe might weaken assurance (or reassurance) of European allies, who saw nuclear war as a greater threat than Soviet expansionism. See Michael Howard, "Reassurance and Deterrence: Western Defense in the 1980s," *Foreign Affairs* 61, no. 2 (Winter 1982): 309–24.

3. This notion of "existential deterrence" was popularized by McGeorge Bundy in the 1980s and reflected a belief that the destructive power of nuclear weapons made them militarily useless and the possession of merely a handful would be a sufficient deterrent to any potential aggressor.

4. Remarks by Pres. Barack Obama, 5 April 2009, Hradcany Square, Prague, Czech Republic.

5. See Josiane Gabel, "The Role of U.S. Nuclear Weapons after September 11," *Washington Quarterly* 28, no. 1 (Winter 2004/05): 193.

6. Ibid., 193–94. See also Kurt M. Campbell, Robert J. Einhorn, and Mitchell B. Reiss, eds., *The Nuclear Tipping Point: Why States Reconsider Their Nuclear* Choices (Washington: Brookings Institution, 2004).

7. US Department of State International Security Advisory Board, *Report on Discouraging a Cascade of Nuclear Weapons States*, 19 October 2007, 23.

8. Ibid., 15.

9. Secretary of Defense Robert M. Gates, "Nuclear Weapons and Deterrence in the 21st Century," speech before Carnegie Endowment for International Peace, 28 October 2008.

10. William J. Perry, James R. Schlesinger, et al., *America's Strategic Posture: The Final Report of the Congressional Commission on the Strategic Posture of the United States* (Washington: US Institute of Peace Press, 2009), xvii.

11. *Active Engagement, Modern Defence: Strategic Concept for the Defence and Security of the Members of the North Atlantic Treaty Organization*, adopted by the Heads of State and Government participating in the meeting of the North Atlantic Council in Lisbon, Portugal, November 2010, http://www.nato.int/lisbon2010/strategic-concept-2010-eng.pdf.

12. For an excellent discussion of assurance and extended deterrence, see David Yost, "Assurance and U.S. Extended Deterrence in NATO," *International Affairs* 85, no. 4 (2009): 755–80.

13. Klaus Naumann, John Shalikashvili, et al., *Towards a Grand Strategy for an Uncertain World: Renewing Transatlantic Partnership* (Lunteren, the Netherlands: Noaber Foundation, 2007), 94.

14. Cited in James L. Schoff, "Does the Nonproliferation Tail Wag the Deterrence Dog?" PacNet no. 9, Center for Strategic and International Studies (CSIS), 5 February 2009, http://csis.org/publication/pacnet-9-february-5-2009-does-nonproliferation-tail-wag-deterrence-dog.

15. Ibid.

16. Keith Payne, "On Nuclear Deterrence and Assurance," *Strategic Studies Quarterly* 3, no. 1 (Spring 2009): 54–55.

17. "Joint Vision for the Alliance of the United States of America and the Republic of Korea," Office of the Press Secretary, The White House, 16 June 2009.

18. Speech by Secretary of Defense Robert M. Gates, 21 October 2009, Yongsan Garrison, Seoul, Republic of Korea.

19. See Russian prime minister Vladimir Putin's statement in "Russia 'Must Counter U.S. Defenses,'" *BBC News*, 29 December 2009, http://news.bbc.co.uk/2/hi/europe/8433352.stm.

20. See Valentina Pop, "Ukraine Drops NATO Membership Bid," *EU Observer*, 4 June 2010, http://euobserver.com/13/30212.

21. This assurance is often referred to as the "three no's" and reflects NATO's earlier commitment to Russia that it has "no intention, no plan, and no reason to deploy nuclear weapons on the territory of new members." See the Founding Act on Mutual Reductions, Cooperation and Security Between NATO and the Russian Federation, Paris, France, 27 May 1997.

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27. Ibid.

28. Joseph F. Pilat, "Nonproliferation, Arms Control and Disarmament, and Extended Deterrence in the New Security Environment," *Strategic Insights* 8, no. 4 (September 2009).

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30. James R. Schlesinger et al., *Report of the Secretary of Defense Task Force on DoD Nuclear Weapons Management*, Phase II: *Review of the DoD Nuclear Mission* (Washington: DoD, December 2008), 14–15, 59–60.

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33. See Alexandra Bell, "Turkey's Nuclear Crossroads," *Good News*, 25 August 2009, http://www.good.is/post/turkeys-nuclear-crossroads. This account is also referenced in Miles A. Pomper, William Potter, and Nikolai Sokov, *Reducing and Regulating Tactical (Nonstrategic) Nuclear Weapons in Europe* (Monterey, CA: Monterey Institute of International Studies, December 2009), 22. In addition, a February 2008 report to the Senate Foreign Relations Committee cited a meeting with Turkish politicians who argued that without strong US commitments to Turkey's security, the development by Iran of a nuclear weapons capability would make it "compulsory" for Turkey to follow suit. See *Chain Reaction: Avoiding a Nuclear Arms Race in the Middle East, Report to the Committee on Foreign Relations* (Washington: US Senate, February 2008), 41.

34. Perry, Schlesinger, et al., *America's Strategic Posture*, 26.

35. See "Nuclear Guarantees, Extended Deterrence, and the Assurance of Allies," 55.

36. Perry, Schlesinger, et al., *America's Strategic Posture*, 20–21.

37. James M. Acton, "Extended Deterrence and Communicating Resolve," *Strategic Insights* 8, no. 5 (December 2009).

38. Hans M. Kristensen, "Japan, TLAM-N, and Extended Deterrence," *Federation of Atomic Scientists Strategic Security Blog*, 2 July 2009, http://www.fas.org/blog/ssp/2009/07/tlam.php.

39. Reported in Jeffrey Lewis, "Japan Hates TLAM-N," *Arms Control Wonk*, 25 January 2010, http://www.armscontrolwonk.com/2601/japan-hates-tlam-n.

40. Office of Secretary of Defense (OSD), *Nuclear Posture Review Report* (Washington: DoD, April 2010), 28.

41. Ibid.

42. Ibid., 27.

43. Ibid., 32.

44. For example, as Jeffrey Lewis has argued: "Would you do something dumb just because the Japanese asked you to? Of course not. That some Japanese officials irrationally focus on irrelevant capabilities to measure our commitment to Japan is a symptom of a much bigger problem that needs to be addressed with more than hardware." See "Japan ♥ TLAM-N," *Arms Control Wonk*, 8 May 2009, http://www.armscontrolwonk.com/2284/japan-tlamn.

45. A discussion of this point can be found in "Nuclear Guarantees, Extended Deterrence, and the Assurance of Allies," in *Planning the Future U.S. Nuclear Force*, Vol. 2, 64.

46. *Securing Britain in an Age of Uncertainty: The Strategic Defence and Security Review*, Cm7948 (London, Her Majesty's Stationery Office [HMSO], October 2010).

47. *The Future of the United Kingdom's Nuclear Deterrent*, Cm6994 (London: HMSO, December 2006).

48. Ibid., 38–39.

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50. Speech by Jacques Chirac, president of the French Republic, to the Strategic Air and Maritime Forces at Landivisiau/L'Ile Longue, 19 January 2006.

51. For example, former defense minister of the Federal Republic of Germany Manfred Wörner stated in 1985, "France's nuclear capability is insufficient to protect the Federal Republic. We will have to continue to rely on the American nuclear umbrella." Cited in Yost, "Assurance and U.S. Extended Deterrence in NATO," 761.

52. See Mark Schneider, "The Future of the U.S. Nuclear Deterrent," *Comparative Strategy* 27 (2008): 345–60.

53. Austin Long, *Deterrence from Cold War to Long War: Lessons from Six Decades of RAND Research* (Santa Monica, CA: RAND, 2008), 63.

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56. Joseph C. Martz and Jonathan S. Ventura, "Nuclear Deterrence in the 21st Century: The Role of Science and Engineering," a paper produced by the principal associate director for nuclear weapons, Los Alamos National Laboratory, LA-UR-08-05019, 2008.

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58. For a discussion of this point, see Yost, "Assurance and U.S. Extended Deterrence in NATO," 755–80.

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60. Ibid., 24.

61. Aluf Benn, "Obama's Atomic Umbrella: U.S. Nuclear Strike if Iran Nukes Israel," *Haaretz*, 12 November 2008.

62. For an interesting perspective on this statement and an analysis of US efforts to extend deterrence to Middle East states, see James A. Russell, "Extended Deterrence, Security Guarantees, and Nuclear Weapons: U.S. Strategic and Policy Conundrums in the Gulf," *Strategic Insights* 8, no. 5, (December 2009), http://www.nps.edu/Academics/centers/ccc/publications/OnlineJournal/2009/Dec/russellDec09.pdf.

63. Indeed, Saudi Prince Turki al-Faisal told a security conference last year that the kingdom might pursue its own nuclear weapons in that event. See Associated Press, "Prince Hints Saudi Arabia May Join Nuclear Arms Race," *New York Times*, 6 December 2011, http://www.nytimes.com/2011/12/07/world/middleeast/saudi-arabia-may-seek-nuclear-weapons-prince-says.html.

64. Unlike previous arms control treaties that established precise numerical ceilings on nuclear force levels, the 2002 Moscow Treaty allowed both the United States and Russia to maintain a range of between 1,700 and 2,200 operationally deployed strategic nuclear weapons. This flexibility was arguably more appropriate and relevant to the variable and evolving requirements of deterrence, including extended deterrence.

65. "Responses by Secretary of Defense Donald H. Rumsfeld and Gen Richard B. Myers to questions submitted for the record by the Senate Foreign Relations Committee on Treaty on Strategic Offensive Reduction: The Moscow Treaty," S. Hrg. 107-622, 107th Cong., 2nd sess. (Washington: GPO, 2002), http://www.gpo.gov/fdsys/pkg/CHRG-107shrg622/pdf/CHRG-107shrg622.pdf.

66. Chris Jones, "The Shades of Extended Deterrence," *CSIS*, 4 January 2010, http://csis.org/blog/shades-extended-deterrence.

67. As one analyst noted, "Because NATO has not identified targets for its nuclear forces since the 1990s, it is a challenge to specify and analyze the 1999 Strategic Concept's requirement for 'adequate nuclear forces in Europe.' . . . The minimum level may derive more from judgments about an appropriate level of risk- and responsibility-sharing among allies, and about what is necessary to demonstrate continuing U.S. engagement and commitment, than from a quantitative analysis of potential contingencies." Yost, "Assurance and U.S. Extended Deterrence in NATO," 758.

68. Urbelis and Paulauskas, "NATO's Deterrence Policy," 99.

Remembrance of Things Past

The Enduring Value of Nuclear Weapons

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> *So long as there is a finite chance of war, we have to be interested in outcomes; and although all outcomes would be bad, some would be very much worse than others.*
>
> —Bernard Brodie

Much has been written about nuclear weapons, but what has been learned? Once an essential element of American foreign and defense policy, these matters were neglected after the Cold War and all but forgotten after September 11th. As the Schlesinger Commission concluded, "Because nuclear weapons have been less prominent since the end of the Cold War and have not been used since World War II, their importance and unique role as a deterrent have been obscured though not diminished."[1] Recent incidents of mismanagement of the US nuclear weapons enterprise, the acquisition of atomic weapons by North Korea, Iran's apparent quest for such weapons, the expiration of the Strategic Arms Reduction Treaty (START) and negotiation of its replacement with Russia, and the decision to engage in a nuclear posture review have brought the

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attention of policy makers to the important question of the role that nuclear forces should play in American strategy.

This is not a new question, but it requires a renewed evaluation. Bernard Brodie pondered it long ago, and his work birthed a rich literature that informed and clarified the round of nuclear debates that resulted in America's first comprehensive nuclear policy—massive retaliation.[2] Today, however, policy makers seem befuddled by nuclear weapons. After 60 years of living with The Bomb, they seem to have forgotten its value. Nuclear weapons produce strategic effects. Their presence compels statesmen to behave cautiously in the face of grave danger. This cautiousness produces restraint, which shores up international stability. In short, nuclear weapons deter.

In this article we first address the concept of deterrence, its requirements, and alternative strategies. We then discuss the effects of nuclear deterrence in international political relations and the capabilities—both nuclear and conventional—required to produce these effects. Finally, we draw conclusions with regard to the appropriate size and composition of the US strategic nuclear arsenal, given our arguments.

What is Deterrence?

From a theoretical standpoint, deterrence links a demand that an adversary refrain from undertaking a particular action to a threat to use force if it does not comply. Deterrence places the adversary in a situation in which it has a choice of complying with what has been demanded of it—inaction—or defying those demands and risking implementation of the deterrer's threatened sanction. What the adversary considers to generate expectations about the consequences of its alternatives has been the subject of wide and varied speculation.[3] These expectations are distilled into expected-value calculations whereby the costs and benefits of an outcome are discounted by the probability of its occurrence (i.e., [benefits – costs] * probability). Then the expected values of possible outcomes stemming from a single course of action are summed. In deterrence the adversary compares the expected value of complying with the deterrer's demand and refraining from action to defying that demand and acting anyway. For deterrence to be successful, the deterrer's threatened sanction must reduce the expected value of defiance so that it is less than the expected value of compliance. The deterrer can do that by threatening to reduce the benefits of defiance or increase its costs. The former would con-

stitute a denial threat, while the latter would be a threat of punishment. And because the adversary will discount these threats by its assessment of the likelihood that the deterrer will implement them, the deterrer must convey these threats credibly.[4]

Deterrence is more than a theory. It is also a policy. States adopt deterrence policies for one reason—to fend off attack. The United States used deterrence to frame its approach to an apparently hostile Soviet Union and to make use of nuclear weapons by not using them. As the Schlesinger Commission put it, "Though our consistent goal has been to avoid actual weapons use, the nuclear deterrent is 'used' every day by assuring friends and allies, dissuading opponents from seeking peer capabilities to the United States, deterring attacks on the United States and its allies from potential adversaries, and providing the potential to defeat adversaries if deterrence fails."[5] Strategic nuclear weapons were used to operationalize strategies of denial and punishment. Denial strategies, generally termed *counterforce*, focused upon mitigating the ability of the adversary to use its military forces, especially nuclear forces, in the event of a conflict so as to reduce its chances of victory. Punishment strategies, generally termed *countervalue*, focused upon destroying the industrial capacity and urban centers of the adversary to impose terrible costs upon its society.[6] During the Cold War, US defense programs were designed and justified in terms of their ability to fulfill these missions.[7] Since 9/11, capabilities have been programmed in an astrategic manner, and many of the mundane considerations of deterrence have been cast aside, making the forging of a new deterrence policy problematic today.[8]

Deterrence theory and policy is based upon the presumption that the adversary to be deterred is rational. The *Deterrence Operations Joint Operating Concept*, which guides US deterrence doctrine and strategy, assumes that "[a]ctions to be deterred result from deliberate and intentional adversary decisions to act (i.e., not from automatic responses or unintended/accidental events). Decisions to act are based on actors' calculations regarding alternative courses of action and actors' perceptions of the values and probabilities of alternative outcomes associated with those courses of action."[9] It is often argued that deterrence is inherently flawed because no human being is perfectly rational—indeed, they often act irrationally.[10] But this is a red herring. As Robert Jervis has argued, "How rational do men have to be for deterrence theory to

apply? Much less than total rationality is needed for the main lines of the theory to be valid."[11] Indeed, given that adversaries of any note lead large organizations—states—and had to pursue strategies to gain and retain power, it is difficult to argue that such persons are irrational or nonrational.[12] They may not be perfect, but they are sensible and react to the incentives of their strategic and domestic environments.[13] This holds also for terrorist groups such as al-Qaeda or Hamas, who utilize suicide terrorism to achieve strategic objectives.[14] It is on this basis that strategy and policy can be readily erected.

Political Effects of Nuclear Weapons

A key goal of any national security policy should be to enhance stability, where stability is defined as the absence of war or major crisis. Assuming the absence of a sudden change in the anarchic nature of the international system, any such policy should rely upon deterring potential aggressors at its base. Nuclear weapons enhance "general deterrence," a concept defined by Patrick Morgan. "*General deterrence* relates to opponents who maintain armed forces to regulate their relationship even though neither is anywhere near mounting an attack" (emphasis in original).[15] The goal of a general deterrent policy would be to ensure that incentives for aggression never outweigh the disincentives.

In theory, nuclear weapons are better than conventional forces in terms of enhancing general deterrence. This is so because deterrence succeeds when the costs—or, more appropriately, the risks of costs—exceed any probable gains that are to be had through armed aggression. War has been such a common international phenomenon throughout the centuries because some decision makers have concluded that the benefits of aggression would outweigh its costs.[16] Such a conclusion can be reached all the more easily when it is believed that victory on the battlefield can be attained quickly and decisively, and there are many historical examples from which decision makers can choose in order to bolster their confidence—from Bismarck's wars against Denmark, the Austrian Empire, and France to Iraq's conquest of Kuwait and its eviction by UN coalition forces.

Injecting the possible use of nuclear weapons by the defending state into the equation, however, can alter these calculations considerably. The possession of a sizable nuclear arsenal by a defender, as well as the means to deliver these weapons to the battlefield or the aggressor's homeland,

makes the risks of aggression much greater and the potential costs much starker. This is because the possession of nuclear weapons tends to equalize the power of states, although not to the absolute degree that some would argue—attributes of national power such as geographic size, population, industrial capacity, GNP, and others still weigh heavily in any assessment of national power. Nonetheless, this equalizing tendency objectively manifests itself in two ways. On the battlefield, nuclear weapons can enhance the power of a smaller conventional force considerably. And in terms of absolute destructive power, only a finite amount of damage is necessary to destroy a modern state as a functioning entity.[17] Provided that two states are capable of developing the means to reliably deliver at least "enough" nuclear weapons to their adversary's homeland to "assure" its destruction, then, in a relative way, the two states can be considered equally powerful.

One could argue that the qualitative differences between nuclear and conventional forces also have certain psychological consequences that make the former a better buttress for general deterrence.[18] Given the destruction that nuclear weapons could wreak in a short temporal period, the potential costs of aggression against a nuclear-armed adversary would be "paid up front," as opposed to over a long period of mutual attrition, and are thus "clearer" to decision makers. And although some conventional munitions can approach the destructiveness of nuclear devices,[19] a certain symbolism has come to be attached to nuclear weapons that has historically enhanced their clarifying quality and induced caution in national decision makers.[20] This clarifying effect operates particularly to the advantage of states defending their vital interests. The threat of a nuclear-armed state to use its nuclear weapons in defense of vital interests, such as its survival or territorial integrity, is almost inherently credible.[21] Thus a secure nuclear arsenal has the effect of "sanctuarizing" the states that possess them. One could argue that nuclear weapons enhance general deterrence by virtually precluding acts of aggression against states that possess them,[22] and thereby greatly enhance stability.

But how large an arsenal is necessary for a state to effectively "sanctuarize" itself? While much of the more recent literature on the value of nuclear weapons as a pacifying force in international relations has implicitly assumed that any number of survivable weapons would be adequate for successful deterrence,[23] in effect arguing for existential deterrence,[24] the concept of proportional deterrence[25] would be a better theoretical guide.

Under a doctrine utilizing proportional deterrence, the defender would need to possess, at a minimum, enough survivable nuclear forces[26] to inflict damage on the aggressor roughly equivalent to the gains—in territory, industrial capacity, et cetera—that the aggressor could hope to achieve if it successfully conquered the defender.[27] This, of course, assumes a strategy of deterrence through punishment—that is, striking at the aggressor's population/industrial centers. Thus, for example, supposing the French, whose strategic doctrine rests upon proportional deterrence, desired to deter an attack by the Soviet Union during the Cold War, they would need enough survivable nuclear forces to inflict damage that was "the equivalent of France"—about 50 million people or striking, if not destroying, 100 to 150 major Soviet cities.[28] Hence, the answer to the question how much is enough for proportional deterrence? rests upon the rough value of the defender's territory, in a geopolitical sense.[29]

China understands this. Adopting a minimum deterrent strategy, China's nuclear numbers remain relatively small compared to the large numbers held by the United States and Russia. It is estimated that China has approximately 400 nuclear weapons, with about 200 operationally deployed. It probably possesses 30 intercontinental ballistic missiles (ICBM) capable of striking the continental United States and about 10 that are capable of striking Hawaii and Alaska. It also possesses about 100 intermediate-range weapons capable of striking US bases, friends, and allies in the Pacific region.[30] These weapons would be enough to destroy more than the value of Taiwan to the United States, the most likely stakes in any conflict between the two countries. In contrast, the United States possesses 450 ICBMs, each capable of carrying up to three warheads; 18 Trident submarines, each equipped with 24 submarine-launched ballistic missiles (SLBM) that carry as many as eight warheads each; and 100 or so nuclear bombers capable of carrying a variety of payloads to include air-launched cruise missiles (ALCM). It is assumed that Russia has a similar mix. Yet, despite these rather large nuclear inequities, China continues to modernize its conventional capabilities, extending its influence throughout the region. How does one explain this behavior?

China is confident that its small nuclear arsenal is sufficient to deter rivals. In international politics, deterrence restrains states from acting externally but affords opportunities to act internally—allowing them to pursue whatever weapons they choose. Shrewd states recognize this as well as the fact that large nuclear arsenals buy them little; as in other ar-

eas of competition, there comes a point of diminishing return, and with nuclear weapons that point comes quickly. There is little the United States or Russia can do militarily to dissuade China from pursuing its armament program. China realizes this, which explains why its nuclear appetite remains satisfied. Might China change? It might if demand were stimulated, which is why nuclear defenses are a bad idea, at least in Asia. In games of deterrence, defenses can be both stabilizing and destabilizing; deciphering when and how is one reason the United States turned its back on defenses, abandoning its civil defense program in favor of a strategy of mutually assured destruction.[31] Today, the United States and China have tacitly entered into what can only be described as a period of mutual retaliation; nothing official has been declared, but both sides know that the stakes are too high for either to make a run militarily at the other.

Nuclear weapons socialize statesmen to the dangers of adventurism, which in turn conditions them to set up formal and informal sets of rules that constrain their behavior. No statesmen want to be part of a system that constrains them, but that is the kind of system that results among nuclear powers. Each state is conditioned by the capabilities of the other, and the relationship that emerges is one that is tempered by caution despite the rhetoric of its leaders.

During the Cuban missile crisis, President Kennedy and Premier Khrushchev sought solutions short of war, despite their sharp political differences.[32] That the Soviets underestimated how the United States would react when confronted with the deployment of missiles off the coast of Florida is interesting but not as telling as how both leaders behaved when they realized what was at stake. Secretary of State Dean Rusk's comment that "We were eyeball to eyeball" is illustrative for two reasons. First, the two sides were staring into the face of grave danger. Second, there were no misperceptions. Both quickly recognized that the outcome of the crisis depended as much on the moves of one side as it did the other. War was the focal point; a threshold easily recognized, best not crossed, and worth avoiding.[33] This occurred despite the fact that the United States had overwhelming superiority in strategic and tactical nuclear forces and significant ability to blunt any Soviet retaliatory strike.[34] From that day forward, the superpowers understood that they could race to the brink but no further, lest they run the risk of nuclear war; a risk that neither side would take. Following the crisis, both sides

took steps to reduce uncertainty and improve crisis stability.[35] What conclusions can be drawn? Small numbers of nuclear weapons produce dramatic effects. In times of crisis, they compel statesmen to act with restraint. In this sense, nuclear statesmen are risk averse, which also makes them vigilant.

Although it has been argued that such stable relations may have been unique to the bipolar relations between the United States and the Soviet Union,[36] they seem to apply elsewhere. Prior to Pakistan acquiring a nuclear capability, it fought three bloody wars with India. Today, in the presence of nuclear forces, the sharp differences that separate India and Pakistan are not sufficient to drive either side to war.[37] While the two sides actively engage in a game of tit-for-tat, nuclear weapons have softened both states and steadied their relationship by reducing the likelihood of interstate war. Far from perfect, relations between India and Pakistan can be summarized as tense but stable.[38]

Might this be the case within the Middle East? So it seems. Although the Arab states fought three wars to destroy Israel prior to widespread knowledge of its unacknowledged nuclear weapons capability, none have been fought since. Should Iran acquire a nuclear capability, the spread of nuclear weapons in the Middle East is all but certain. Although Israel's security will be challenged, given the potential for a mutual deterrent relationship to take hold thereby limiting its freedom of action, this constraint will also obtain throughout the region. Until it does, the challenge posed to Saudi Arabia in particular will be significant.[39] It is important to stress that the Iranian bomb will be a Shia bomb and the Sunni community will be hard pressed. Stabilizing the region until a Saudi weapons capability is ready will not be easy, and the options available to the United States are less than optimal. It could extend a security guarantee to the Saudis, but that would enlarge America's presence in the region, which would not sit well with extremists. Defensive systems could be deployed, but the down sides are similar to extending security guarantees. Islamic extremists would exploit their presence, holding them up as yet another example of the kingdom's dependency on the United States. A regional approach where the United States and its partners collectively provide for the defense of Saudi Arabia and the broader Sunni community might be effective, but the list of potential partners is short. Given all of this, the shrewdest thing to do might be nothing. As odd as it sounds, the United States might be better off by not acting and

even allowing the Saudis to deploy a counterweapon should the Iranians decide to do so. In short, more might be better.[40]

Toward A Minimal US Nuclear Deterrent

But perhaps not in arsenals that are already outsized. In the 1960s, the Kennedy administration recognized the need for a secure retaliatory capability and the desire of the services—particularly the Air Force—to purchase capabilities that far outstripped that objective.[41] It therefore sought to program capabilities that would be invulnerable to a counterforce strike and would be able to inflict unacceptable damage on the Soviet Union—but no more.[42] Looking back, Secretary of Defense McNamara had this to say: "Our goal was to ensure that they, with their theoretical capacity to reach such a first-strike capability, would not outdistance us. But they could not read our intentions with any greater accuracy than we could read theirs. The result has been that we have both built up our forces to a point that far exceeds a credible second-strike capability against the forces we each started with. In doing so neither of us has reached a first-strike capability."[43] In other words, both sides were, in fact, deterred fairly early on during the Cold War, even though that may or may not have been the intention, and the actual marginal utility of additional forces was quite small.

Therefore, as policy makers await the release of the administration's nuclear posture review, the question is not whether the United States can reduce its number of nuclear weapons to zero. Instead, the question is: What size force is needed for deterrence? Those numbers are comparatively small. Today the United States can adopt a minimum deterrence strategy and draw down its nuclear arsenal to a relatively small number of survivable, reliable weapons dispersed among missile silos, submarines, and airplanes.

Strategic air commander Gen Thomas Power said in 1965 that "The optimum deterrent must lie somewhere between the illusory minimum and the impossible maximum." To chart a course to the "illusory minimum," a pragmatic approach must be found that comforts policy makers that have come to rely on the war-deterring effects of nuclear weapons for six decades. Skeptical constituencies are more likely to embrace smaller numbers of nuclear weapons if the arsenal is reduced gradually. With this in mind, the International Commission on Nuclear Non-Proliferation and Disarmament proposed that the United States reduce

to 500 nuclear weapons by 2025.[44] This represents a 90-percent reduction in the nuclear arsenal but offers more than enough deterrent capability while providing flexibility to pragmatically implement the force structure cuts.

In fact, the United States could address military utility concerns with only 311 nuclear weapons in its nuclear force structure while maintaining a stable deterrence. These 311 weapons should include missiles that are integral to a stable deterrence because they cannot be moved, are easily detected, and can hold enemy forces at bay with pinpoint accuracy. One hundred single-warhead ICBMs, such as the Minuteman III systems currently in service, provide a disbursed, ready force that may be more politically palatable than more severe reductions. The sea leg of the triad can be constituted by 192 de-MIRVed Trident D-5 SLBMs on 12 *Ohio* class submarines, each capable of holding 24 missiles. This would allow two patrols of four boats each at any given time. These missiles are highly survivable as they can be moved, cannot be easily detected, and, with pinpoint accuracy, can hold hardened targets at risk if necessary. Furthermore, British and French nuclear capabilities remain available to assure European allies, if any perceive weakness based on this force reduction in the Atlantic. Finally, air-launched cruise missiles (ALCM) from 19 B-2s will continue to contribute standoff capability and flexibility to the triad. This is more than enough weapons to use aircraft for nuclear escalation control and political signaling while allowing all B-52Hs to convert and focus on a their conventional role. As with the SLBM force, ALCMs can be shuttled from wing to wing for operational security or intermixed with conventional munitions—a solution first proposed by Brodie.[45]

In short, America's nuclear security can rest easily on a relatively small number of counterforce and countervalue weapons totaling just over 300. Moreover, it does not matter if Russia, who is America's biggest competitor in this arena, follows suit. The relative advantage the Russians might gain in theory does not exist in reality. Even if one were to assume the worst—a bolt from the blue that took out all of America's ICBMs—the Russians would leave their cities at risk and therefore remain deterred from undertaking the first move. Skeptics will rightfully attack this argument, so it is best to address a few concerns.

First, there will be those who insist that a minimum nuclear posture is of little value to the United States because it must maintain a nuclear arsenal large enough to cover all of its contingencies. In other words,

while Pakistan has to contend with India, the United States has several potential contenders that, when combined, pose a large challenge. There is logic in that line of reasoning, but it ignores the vast conventional superiority of the United States. It is clear that in most circumstances conventional weapons will be preferred to nuclear ones and supplement the Global Strike mission. Indeed, Lieber and Press recognize this in their recent analysis of nuclear capabilities.[46] It is also undermined by the fact that the United States is deterred in most contingencies by China, which has a much smaller force structure. Presumably, if China can deter the United States, small numbers are effective. In fact, arguments for a large force have no meaning unless they are tied to an exclusive counterforce strategy directed against Russia, which, when all is said and done, does not appear to be necessary. During the Cold War, the superpowers raced to increase numbers in an attempt to prevent one side from acquiring either a counterforce capability or a symbolic numerical advantage. All the while, both sides lost sight of the fact that it is the political value of nuclear weapons that matters most, not their military utility. New nuclear states seem satisfied with small numbers. One wonders why. It either has something to do with the number of threats that they face or with their appreciation of the political value of nuclear weapons. A definitive answer is out of reach, which is why debate on this issue is so important.

The second criticism has to do with the future of the triad, which was the fulcrum of deterrence throughout the Cold War. Some might argue that the triad was effective and its redundancy and flexibility shored up international stability and helped keep the Cold War cold. It is, however, important to recall that the Soviets had no such operational concept. They relied heavily, almost exclusively, on missiles and still managed to deter the United States. If one accepts the basic idea that it is the political value of nuclear weapons that matters, the method of delivery is immaterial.

Lastly, there is concern over organizational competency and professional development. How small can a force become before it no longer resembles a force at all? That is a difficult question to answer. In some instances, a smaller force can be extremely competent, and increasing its size could lead to its undoing. One thinks of the Navy SEALs. What makes the SEAL program so effective is that it is highly selective, well funded, specialized, and small. Might the same hold true for nuclear

warriors? That is a question for others to answer. Sizing of the nuclear force should be based primarily on the requirements for a stable, reliable, nuclear deterrent, with support issues like industrial base support, crew force management, and training only weighing in as secondary considerations.

Conclusions

Deterrence evolved throughout the Cold War, moving from massive retaliation to the intricate targeting schemes of countervailing strategies. All the while the superpowers came to understand what Brodie aptly described as "strategy in the missile age." Despite the harsh rhetoric and big words from both sides, they came to appreciate what these weapons meant and behaved accordingly. While both vied for attention and aggressively pursued international influence, neither side initiated or threatened to initiate a nuclear exchange. In short, nuclear learning occurred. Something similar is taking place in other parts of the world. China, India, Pakistan, North Korea, and presumably, Iran understand that a small number of nuclear weapons is all that is needed for deterrence to take hold. Others will learn too, which is why nuclear weapons ought to be the centerpiece of American strategy. That does not mean that they should be America's only concern, just the most important one.

Would the world be better off without nuclear weapons? Although it might be desirable to rid the world of nuclear weapons, it is not wise. "The web of social and political life is spun out of inclinations and incentives, deterrent threats and punishments." Take away the latter two and international society depends entirely on the former—a utopian thought impractical "this side of Eden."[47] Serious-minded men have wished it were not so. Gen Charles Horner, then head of US Space Command, explained in 1994, "I want to get rid of all [nuclear weapons]. I want to go to zero. I'll tell you why. . . . Think of the moral high-ground we secure by having none."[48] Two years later, addressing the National Press Club in December 1996, Gen Lee Butler, former commander of Strategic Air Command, wondered if "it is possible to forge a global consensus on the propositions that nuclear weapons have no definitive role; that the broader consequences of their employment transcend any asserted military utility."[49] In both instances, what was overlooked is the role that force plays in international life. In politics,

force is said to be the ultima ratio. In international politics, it is the first and constant one.[50] Force casts a long shadow and serves as an incentive to temper statesmen, moderate demands, and settle disputes. That the use of nuclear weapons is to be avoided does not render them useless. Quite the opposite—nuclear weapons might be the most politically useful weapons a state can possess, which helps explain why they are spreading.

Nuclear weapons allow international life to go on in spite of their inherent dangers because leaders of nuclear states realize that that they are constrained despite their goals, desires, or rhetoric. The international system, with its uneven distribution of material capabilities throughout the world, regulates what states can and cannot do. Nuclear weapons add to this by making the likelihood of war among nuclear powers less, not more, likely.[51] Shrewd statesmen recognize this as well as the realities of power in international life. The fact is some states will pursue nuclear weapons; others will not.

In the final analysis, security is the problem; weapons one solution. The spread of nuclear weapons is derived from the relative insecurity of some states in the world. So long as war remains a finite possibility, we have to be concerned with outcomes, and while some would be bad, others would be worse. In the age of minimum deterrence, the world will have to stand for a few more nuclear states; the majority of them will not pursue nuclear weapons. Pursuit of such weapons is contingent upon security. If states can achieve it without them, they have no need for them, which is another way of saying a nuclear-free world hinges on a more secure one. That we are not there yet is reason enough to work to make it so. SSQ

Notes

1. *Report of the Secretary of Defense Task Force on DoD Nuclear Weapons Management, Phase I: The Air Force's Nuclear Mission* (Washington, DC: Office of the Secretary of Defense, September 2008), 1.

2. Bernard Brodie, *The Absolute Weapon* (New York: Harcourt and Brace, 1946); *Strategy in the Missile Age* (Princeton: Princeton University Press, 1959); and *Escalation and the Nuclear Option* (Princeton: Princeton University Press, 1966). Also see Lawrence Freedman, *The Evolution of Nuclear Strategy* (New York: Palgrave, 2003); William Fox, *The Superpowers: The United States, Britain and the Soviet Union* (New York: Harcourt and Brace, 1954); Alexander George and Richard Smoke, *Deterrence in American Foreign Policy: Theory and Practice* (New York: Columbia University Press, 1974); Morton Halperin, *Limited War in the Nuclear Age*

(New York: John Wiley and Sons, 1963); Herman Kahn, *On Thermonuclear War* (Princeton: Princeton University Press, 1960); George Kennan, *Russia, the Atom and the West* (New York: Harper and Brothers, 1958); Henry Kissinger, *Nuclear Weapons and Foreign Policy* (New York: Harper, 1957); Robert Osgood, *Limited War: the Challenge to American Strategy* (Chicago: Chicago University Press, 1957); Thomas Schelling, *The Strategy of Conflict* (Cambridge: Harvard University Press, 1960); and Schelling, *Arms and Influence* (New Haven: Yale University Press, 1966).

3. See, for example, William W. Kaufmann, "The Requirements of Deterrence," in *Military Policy and National Security*, ed. William W. Kaufmann (Port Washington, NY: Kennikat Press, 1956); George and Smoke, *Deterrence in American Foreign Policy*; and Paul Huth and Bruce Russett, "What Makes Deterrence Work? Cases from 1900 to 1980," *World Politics* 36, no. 4 (July 1984).

4. See Daryl G. Press, *Calculating Credibility: How Leaders Assess Military Threats* (Ithaca: Cornell University Press, 2005), for a discussion of the constituents of credibility.

5. *Report of the Secretary of Defense Task Force*, 1.

6. Freedman, *Evolution of Nuclear Strategy*, passim; Desmond Ball and Jeffrey Richelson, eds., *Strategic Nuclear Targeting* (Ithaca: Cornell University Press, 1986).

7. Lawrence Freedman, "Does Deterrence Have a Future?" *Arms Control Today* 30, no. 8 (October 2000).

8. Jonathan Schell, *The Seventh Decade: The Shape of Nuclear Danger* (New York: Metropolitan Books, 2007), 119.

9. *Deterrence Operations Joint Operating Concept*, version 2.0 (Washington, DC: DoD, December 2006), 11.

10. The classic statement of this critique is Stephen Maxwell, *Rationality in Deterrence*, Adelphi Paper 50 (London: International Institute for Strategic Studies, August 1968).

11. Robert Jervis, "Deterrence Theory Revisited," *World Politics* 31, no. 2 (January 1979): 299.

12. This is not a small point. In military circles, where one would expect to find some degree of emphasis placed upon rationality, the idea of the irrational actor has taken hold. This is especially true since 9/11. In discussing strategy with officers of all ranks, one is pressed with the retort "but you are assuming that the other guy is rational." No doubt suicide terrorists appear to be irrational at first, but even they are more than capable of reasoning. Waltz has made this point time and again. See Scott D. Sagan and Kenneth N. Waltz, *The Spread of Nuclear Weapons: A Debate* (New York: W. W. Norton and Co., 1995), 112–13, for an example.

13. For an analysis of the motives of adversaries in deterrence situations, see Gary Schaub Jr., "When is Deterrence Necessary? Gauging Adversary Intent," *Strategic Studies Quarterly* 3, no. 4 (Winter 2009): 49–74.

14. Robert A. Pape, *Dying to Win: The Strategic Logic of Suicide Terrorism* (New York: Random House, 2005).

15. Patrick Morgan, *Deterrence*, 2nd ed. (Beverly Hills: Sage Publications, 1983), 30.

16. John J. Mearsheimer, *Conventional Deterrence* (Ithaca: Cornell University Press, 1983).

17. A point first made by Brodie, "The Weapon," in *Absolute Weapon*, 25.

18. See Schelling, *Arms and Influence*, 133.

19. For example, fuel-air explosives or precision-guided conventional munitions capable of destroying hardened targets.

20. Nina Tannenwald, *The Nuclear Taboo: The United States and the Non-Use of Nuclear Weapons since 1945* (New York: Cambridge University Press, 2008).

21. Of course many have argued that if the aggressor also possesses nuclear weapons capable of striking the defender's territory with impunity, it would be irrational for the deterring state to carry out its retaliatory threat, particularly one directed against the adversary's population/industrial centers, as this would surely invite similar reprisals. In such a situation

of mutual deterrence, it is argued, the deterrent threat would lack credibility. See, for example, Raymond Aron, *The Great Debate: Theories of Nuclear Strategy* (Garden City: Doubleday and Co., 1965), 128–30. This conundrum is generally solved, however, by claiming that the aggressor could not count upon the decision makers of the state it is attacking to be rational at a time of acute crisis; those decision makers could retaliate despite the probable consequences in a fit of anger or despair. As Glenn Snyder put it, "A thermonuclear attack based on an expectation that the victim would behave rationally would be a very dangerous gamble for the attacker." Glenn H. Snyder, *Deterrence and Defense: Toward a Theory of National Security* (Princeton: Princeton University Press, 1961), 64. There is a good deal of case study literature that suggests this is also the case in the event of a conventional attack. See Richard Ned Lebow, *Between Peace and War: The Nature of International Crisis* (Baltimore: Johns Hopkins University Press, 1981), for example.

22. This, of course, is direct deterrence. As discussed in many places, the protection of allies, forces overseas, or even noncontiguous possessions (such as Great Britain's crown colony, the Falkland Islands), are matters of extended deterrence, which is inherently more difficult. See Schelling, *Arms and Influence*, for an incisive discussion of this distinction.

23. For example, Stephen Van Evera discusses "states with developed nuclear arsenals [that] can annihilate each other even after absorbing an all-out attack" and provides France, Great Britain, and the Soviet Union as apparent examples of states with a mutually assured destruction capability. Stephen Van Evera, "Primed for Peace: Europe after the Cold War," *International Security* 15, no. 3 (Winter 1990/91): 13. But obviously, it would take a much larger nuclear capability to "assure" the destruction of Soviet society than that of France or Great Britain, given the much greater size, population, and resources of the Soviet Union. And while it was easily assumed that the Soviet Union possessed the capability of absorbing an "all-out" counterforce attack by either (or both) France or Great Britain, the opposite was not so easily assumed. As David Yost wrote, "The targeting objectives of France's 'enlarged anti-cities strategy' . . . call for France to be able to strike at least a hundred 'vital centers' in the USSR in a second strike. . . . France's ability to do so, even in a first strike, is minimal today," that is in 1984 when France possessed 132 deliverable strategic nuclear warheads. David Yost, *France's Deterrent Posture and Security in Europe, Part I: Capabilities and Doctrine*, Adelphi Paper 194 (London: International Institute for Strategic Studies, Winter 1984/85), 28. As for the British, they recognized their inability to assure the destruction of Soviet society and based the "independent" version of their strategic doctrine, as well as designing the performance characteristics of their Polaris force, around the "Chevaline concept" of destroying only one very important target in the Soviet Union: Moscow. Lawrence Freedman, "British Nuclear Targeting," in *Strategic Nuclear Targeting,* 112–23.

Mearsheimer makes similar omissions concerning the capability necessary to successfully bolster deterrence with nuclear weapons. Only in the context of the Ukraine does he get more specific: "128 nuclear warheads . . . should be more than enough to wreak vast destruction on Russia. Even if only 10 percent or 13 of those warheads reached Russian cities, they would leave Russia devastated." John J. Mearsheimer, "The Case for a Ukrainian Nuclear Deterrent," *Foreign Affairs* 72, no. 3 (Summer 1993): 62. Mearsheimer's 13 deliverable warheads as an adequate deterrent closely resembles McGeorge Bundy's 10-warhead "disaster beyond history" standard that is generally used as an example of a minimum deterrent capability. Michael Salman, Kevin J. Sullivan, and Stephen Van Evera, "Analysis or Propaganda? Measuring American Strategic Nuclear Capability, 1969–88," in *Nuclear Arguments: Understanding the Strategic Nuclear Arms and Arms Control Debates*, eds. Lynn Eden and Steven E. Miller (Ithaca: Cornell University Press, 1989), 210.

24. The concept of existential deterrence is elaborated upon in McGeorge Bundy, *Danger and Survival: The Political History of the Nuclear Weapon* (New York: Random House, 1988);

and Robert Jervis, *The Meaning of the Nuclear Revolution: Statecraft and the Prospect of Armageddon* (Ithaca: Cornell University Press, 1990).

25. The concept of proportional deterrence is elaborated upon in Pierre Gallois, *Balance of Terror: Strategy for the Missile Age* (Boston: Houghton Mifflin, 1961). Gallois' thinking is critiqued in Aron, *Great Debate*, 120–43.

26. As well as robust, survivable command and control capabilities.

27. Or, as Edward Kolodziej put it in terms of French strategic doctrine, "French military theorists . . . contended, however, that they could deter other states, even superpowers, because they possessed a destructive capability that would offset any gain envisioned by a potential aggressor. *The French force was alleged to be proportional in strategic capacity to France's political interests.* . . . France might be destroyed in the nuclear exchange, but the aggressor would presumably absorb more damage than could be reasonably offset by the anticipated benefits of his attack on France." Edward A. Kolodziej, *French International Policy under De Gaulle and Pompidou: The Politics of Grandeur* (Ithaca: Cornell University Press, 1974), 102 (emphasis added).

28. Yost, *France's Deterrent Posture*, 15, 18.

29. Of course the aggressor may value the defender's territory more or less given other factors, such as the symbolic value a victory over the defender would bestow, etc.

30. See William J. Perry and James A. Schlesinger, chairmen, *America's Strategic Posture: The Final Report of the Congressional Commission on the Strategic Posture of the United States* (Washington, DC: US Institute of Peace, 2009), 10–11.

31. A classic consideration of the problem is Donald G. Brennan, Leon W. Johnson, Jerome B. Weisner, and George S. McGovern, *Anti-Ballistic Missile: Yes or No?* (New York: Hill and Wang, 1968).

32. Graham Allison and Philip Zelikow, *Essence of Decision: Explaining the Cuban Missile Crisis*, 2nd ed. (New York: Longman, 1999).

33. For a discussion of strategy and focal points, see Thomas Schelling, *The Strategy of Conflict* (Cambridge: Harvard University Press, 1960).

34. Allison and Zelikow, *Essence of Decision*, 92–95.

35. Jack Mendelsohn, James P. Rubin, Matthew Bunn, Michèle Flournoy, and Jesse James, *Arms Control and National Security: An Introduction* (Washington, DC: Arms Control Association, 1989), 23–25; and John Lewis Gaddis, "The Long Peace Elements of Stability in the Postwar International System," *International Security* 10, no. 4 (Spring 1986).

36. Lawrence Freedman, *Deterrence* (Cambridge: Polity, 2004), 75–83.

37. The Kargil conflict is the case often cited as the exception to the rule. The conflict began in May 1999 and ended in July of that year. During this time, Indian army units attacked Pakistani forces, and Indian jets bombed their bases high in the Himalayan Mountains. Although Indian forces carefully stayed on their side of the line of control in Kashmir, Indian prime minister Atal Bihari Vajpayee informed the US government that he might have to order an invasion into Pakistan. Eventually, President Clinton got involved and assured both sides that he would take an interest in resolving the dispute. Although at least 1,000 Indian and Pakistani soldiers were killed during this crisis, we do not agree with those who think of Kargil as a war. If one unquestionably accepts Singer and Small's definition of war—see J. David Singer and Melvin Small, *The Wages of War 1816–1965: A Statistical Handbook* (New York: John Wiley and Sons, 1972), which defines war as a conflict that involves one member of the interstate system on each side in which the battle-connected deaths totaled at least 1,000—the Kargil crisis was a war. However, if one thinks of war in terms of the ordinary sense of the word, its conduct more closely resembled a nasty skirmish.

38. For interesting perspectives, see Sumat Ganguly, "Nuclear Stability in South Asia," *International Security* 33, no. 2 (Fall 2008); and S. Paul Kapur, "Ten Years of Nuclear Instability in Nuclear South Asia," ibid.

39. It is assumed that Israel has deterrent options readily available, should they choose to unveil them. The Sunnis have no such option.

40. See Kenneth Waltz and Scott Sagan, *The Spread of Nuclear Weapons: A Debate Renewed* (New York: W. W. Norton and Co., 2003).

41. David Alan Rosenberg, "The Origins of Overkill: Nuclear Weapons and American Strategy, 1945–1960," *International Security* 7, no. 4 (Spring 1983).

42. Alian Enthoven and K. Wayne Smith, *How Much Is Enough? Shaping the Defense Program, 1961–1969* (New York: Harper and Row, 1971).

43. *The Dynamics of Nuclear Strategy*, Department of State Bulletin LVII, 9 October 1967.

44. Gareth Evans and Yoriko Kawaguchi, *Eliminating Nuclear Threats: A Practical Guide for Global Policymakers—Report of the International Commission on Nuclear Non-Proliferation and Disarmament* (Canberra: Paragon, 2009).

45. Brodie, "Weapon," 37.

46. Keir A. Lieber and Daryl G. Press, "The Nukes We Need," *Foreign Affairs* 88, no. 6 (November/December 2009): 48.

47. Kenneth Waltz, *Theory of International Politics* (Boston: McGraw Hill, 1979), 186.

48. Gen Charles Horner (press briefing, 15 July 1994).

49. Gen Lee Butler (speech, National Press Club, 4 December 1996).

50. Waltz, *Theory of International Politics*, 113.

51. This is largely a structural claim. See Waltz, *Theory of International Politics*, for the definitive account.

Chinese Military Modernization

Implications for Strategic Nuclear Arms Control

China's political and military objectives in Asia and worldwide differ from those of the United States and Russia, reflecting a perception of that nation's own interests and of its anticipated role in the emerging world order.[1] Its growing portfolio of smart capabilities and modernized platforms includes stealth aircraft, antisatellite warfare systems, quiet submarines, "brilliant" torpedo mines, improved cruise missiles, and the potential for disrupting financial markets. Among other indicators, China's already deployed and future Type 094 *Jin*-class nuclear ballistic missile submarines (SSBN), once they are equipped as planned with JL-2 submarine launched ballistic missiles, will for the first time enable Chinese SSBNs to target parts of the United States from locations near the Chinese coast. Along with this, China's fleet of nuclear-powered attack submarines supports an ambitious anti-access/area denial (A2/AD) strategy to deter US military intervention to support allied interests in Asia against Chinese wishes.[2] China's diplomacy creates additional space for maneuver between Russian and American perceptions. While China may lack the commitment to arms control transparency, the nation's current and future military modernization entitles Beijing to participate in future Russian-American strategic nuclear arms control talks.

Entering China into the US-Russian nuclear-deterrence equation creates considerable analytical challenges, for a number of reasons. To understand these challenges one must consider the impact of China's military modernization, which creates two follow-on challenges: escalation control and nuclear signaling.

Military Modernization

China's military modernization is going to change the distribution of power in Asia, including the distribution of nuclear and missile forces. This modernization draws not only on indigenous military culture but also on careful analysis of Western and other experiences. As David Lai has noted, "The Chinese way of war places a strong emphasis on the use of strategy, stratagems, and deception. However, the Chinese understand that their approach will not be effective without the backing of

hard military power. China's grand strategy is to take the next 30 years to complete China's modernization mission, which is expected to turn China into a true great power by that time."[3]

Chinese military modernization and defense guidance for the use of nuclear and other missile forces hold some important implications for US policy. First, Chinese thinking is apparently quite nuanced about the deterrent and defense uses for nuclear weapons. Despite the accomplishments of modernization thus far, Chinese leaders are aware that their forces are far from nuclear-strategic parity with the United States or Russia. Conversely, China may not aspire to this model of nuclear-strategic parity, such as between major nuclear powers, as the key to war avoidance by deterrence or other means. China may prefer to see nuclear weapons as one option among a spectrum of choices available in deterring or fighting wars under exigent conditions and as a means of supporting assertive diplomacy and conventional operations when necessary. Nuclear-strategic parity, as measured by quantitative indicators of relative strength, may be less important to China than the qualitative use of nuclear and other means as part of broader diplomatic-military strategies.[4]

Second, China is expanding its portfolio of military preparedness not only in platforms and weapons but also in the realms of command, control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR) and information technology. Having observed the US success in Operation Desert Storm against Iraq in 1991, Chinese military strategists concluded that the informatization of warfare under all conditions would be a predicate to future deterrence and defense operations.[5] As Paul Bracken has noted, the composite effect of China's developments is to make its military more agile—meaning, more rapidly adaptive and flexible.[6] The emphasis on agility instead of brute force reinforces traditional Chinese military thinking. Since Sun Tzu, the acme of skill has been winning without fighting, but if war is unavoidable, delivering the first and decisive blows is essential. This thinking also stipulates that one should attack the enemy's strategy and his alliances, making maximum use of deception and basing such attacks on superior intelligence and estimation. The combination of improved platforms and command-control and information warfare should provide options for the selective use of precision fire strikes and cyberattacks against pri-

ority targets while avoiding mass killing and fruitless attacks on enemy strongholds.[7]

Escalation Control

Another characteristic of the Chinese military modernization that is important for nuclear deterrence and arms control in Asia is the problem of escalation control. Two examples or aspects of this problem might be cited here. First, improving Chinese capabilities for nuclear deterrence and for conventional warfighting increases Chinese leaders' confidence in their ability to carry out an A2/AD strategy against the United States or another power seeking to block Chinese expansion in Asia. This confidence might be misplaced in the case of the United States. The United States is engaged in a "pivot" in its military-strategic planning and deployment to Asia and, toward that end, is developing US doctrine and supporting force structure for "AirSea Battle" countermeasures against Chinese A2/AD strategy.[8]

Another problem of escalation control is the question of nuclear crisis management between a more muscular China and its Asian neighbors or others. During the Cold War era, Asia was a comparative nuclear weapons backwater, since the attention of US and allied North Atlantic Treaty Organization policy makers and military strategists was focused on the US-Soviet arms race. However, the world of the twenty-first century is very different. Europe, notwithstanding recent contretemps in Ukraine, is a relatively pacified security zone compared to the Middle East or to South and East Asia, and post–Cold War Asia is marked by five nuclear weapons states: Russia, China, India, Pakistan, and North Korea. The possibility of a nuclear weapon use, growing out of a conventional war between India and Pakistan or China and India, is nontrivial, and North Korea poses a continuing uncertainty of two sorts. This latter nation might start a conventional war on the Korean peninsula, or the Kim Jung-un regime might implode, leaving uncertain the command and control over the nation's armed forces, including nuclear weapons and infrastructure.[9]

The problem of keeping nuclear-armed states below the threshold of first use or containing escalation afterward was difficult enough to explain within the more simplified Cold War context. Uncertainties would be even more abundant with respect to escalation control in the aftermath of a regional Asian war. There is also the possibility of a US-

Chinese nuclear incident at sea or a clash over Taiwan escalating into conventional conflict, accompanied by political misunderstanding and the readying of nuclear forces as a measure of deterrence. The point is US and Chinese forces would not actually have to fire nuclear weapons to use them. Nuclear weapons would be involved in the conflict from the outset, as offstage reminders that the two states could stumble into a mutually unintended process of escalation.

An important correction or cautionary note must be introduced at this point. Policy makers and strategists have sometimes talked as if nuclear weapons always serve to dampen escalation instead of exacerbating it. This might be a valid theoretical perspective under normal peacetime conditions. However, once a crisis begins—and especially after shooting has started—the other face of nuclear danger will appear. Thereafter, reassurance based on the assumption that nuclear first use is unthinkable may give way to such an attack becoming very thinkable. As Michael S. Chase has warned, miscalculation in the middle of a crisis is a "particularly troubling possibility," heightened by uncertainty about messages the sides are sending to one another and/or leaders' overconfidence in their ability to control escalation.[10]

The "Thucydides Trap" and Nuclear Signaling

Chinese decisions about nuclear force modernization will not take place in a political vacuum. One important issue for US-Chinese strategic planning is whether China and the United States will allow their political relations to fall into the "Thucydides trap," which refers to the relationship between a currently leading or hegemonic military power and a rising challenger—as in the competition between a dominant Athens and a rising Sparta preceding the Peloponnesian War.[11] The Thucydides trap occurs when a leading and rising power sees their competition as a zero-sum game in which any gain for one side automatically results in a commensurate loss in power or prestige for the other side. It is neither necessary nor obvious that US-Chinese diplomatic-strategic behavior be driven to this end. However, China's challenges in Asia against US or allied Pacific interests might provoke a regional dispute with the potential to escalate into a more dangerous US-Chinese confrontation, including resort to nuclear deterrence or threats of nuclear first use.

Even if both Washington and Beijing avoid the Thucydides trap, China has the option of *using* nuclear weapons for diplomatic or strate-

gic objectives short of war or explicit nuclear threats. We miss important possibilities for the political exploitation of nuclear weapons if we confine our analysis of China's options to threats or acts of nuclear first use or first strike. The following list includes some of the ways China might signal nuclear weapons use to support its foreign policy in possible confrontations with the United States or US Asian allies:

- Nuclear tests during a political crisis or confrontation
- Military maneuvers with nuclear-capable missile submarines or naval surface forces
- Generated alert for air defense forces to reinforce declaration of an expanded air defense identification zone closed to all foreign traffic
- Open acknowledgment of hitherto unannounced—and undetected by foreign intelligence—long- and intermediate-range missiles based underground in tunnels on moveable or mobile launchers
- Adoption of a launch-on-warning policy in case of apparent enemy preparations for nuclear first use
- Cyberattacks against military and critical infrastructure targets in the United States or against a US ally, including important military and command-control networks in Asia, preceded or accompanied by movement of forces to improve first-strike survivability against conventional or nuclear attack
- Relocation of People's Liberation Army Second Artillery command centers to more protected sites
- Preparation for antisatellite launches against US or other satellites in low earth orbit
- Mobilization of reserves for military units that are nuclear capable
- Shake-up of the chain of command for political or military control of nuclear forces or force components

None of the preceding activities would necessarily be accompanied by explicit threats of nuclear first use or retaliation. Chinese political and military leaders would expect US intelligence to notice the actions and hope for US forbearance. China's expectation might include either a willingness to settle a disagreement based on the status quo or on some newly acceptable terms. Creative analysts or experienced military and

intelligence professionals could expand the preceding list; it is neither exhaustive nor definitive of China's options for nuclear-related signaling.

Contrary to some expert opinion, the relationship between China's ability to exploit its nuclear arsenal for political or military-deterrent purposes and China's apparent expertise in cyberwar deserves closer scrutiny. It is true nuclear war and cyberwar inhabit separate universes in terms of organization, mission, and technology. Moreover, the consequences of a nuclear war would certainly be more destructive than any cyberwar fought between the same states or coalitions. In addition, deterrence seems easier to apply as a concept to nuclear war, compared to cyberwar. Among other reasons, the problem of attribution in the case of a nuclear attack is simple compared to the case of a cyberattack.[12]

Notwithstanding the preceding caveats, in the information age it is likely that cyber and nuclear worlds will have overlapping concerns and some mutually supporting technologies. For the foreseeable future, nuclear-strategic command and control, communications, reconnaissance and surveillance, and warning systems—unlike those of the Cold War—will be dependent upon the fault tolerance and fidelity of information networks, hardware and software, and security firewalls and encryption. Therefore, these systems and their supporting infrastructures are candidate targets in any enemy version of the US Nuclear Response Plan (formerly Single Integrated Operational Plan). In thinking about this nuclear and cyber nexus, it becomes useful to distinguish between a state's planning for a preventive versus a preemptive attack.

During the Cold War, most of the nuclear-deterrence literature was focused on the problem of nuclear preemption, in which a first-strike nuclear attack would be taken under the assumption that the opponent had already launched its nuclear forces or had made a decision to do so. On the other hand, preventive nuclear war was defined as a premeditated decision by one state to weaken a probable future enemy before that second state could pose an unacceptable threat of attack. Most Cold War political leaders and their military advisors rightly regarded preventive nuclear war as an ethically unacceptable and strategically dysfunctional option.[13]

In a world in which the day-to-day functioning of military forces and civil society is now dependent upon the Internet and connectivity, the option of a preventive war with two phases now presents itself to nuclear-armed states. In the first phase, selective cyberattacks might

disable key parts of the opponent's nuclear response program—especially nuclear-related C4ISR. In the second phase, a nuclear threat of first use or first strike might follow against an enemy partially crippled in its ability to analyze its response options or to order those responses into prompt effect. If this scenario seems improbable in the context of large states like the United States, Russia, and China because of their force and command-control diversity and protection, consider how it might work in the context of confrontations between smaller nuclear-armed states, including hypothetical future India-Pakistan or Israel-Iran showdowns.[14] Even in the cases of US conflict with China or Russia (or between China and Russia), nuclear crisis management would certainly include preparation for possible cyberattacks preceding or accompanying nuclear first use or first strike.

Conclusion

China is a possible but not inevitable partner for the United States and Russia if the latter nations are to go forward with post–New START strategic nuclear arms reductions. China's military modernization and economic capacity create the potential for that nation to deploy within this decade or soon thereafter a "more than minimum" deterrent sufficient to guarantee unacceptable retaliation against any attack—especially if China's less-than-intercontinental-range forces are taken into account. Chinese missiles and aircraft of various ranges can inflict damage on Russian territory and on US-related targets in Asia, including US allies and bases. Nevertheless, an open-ended Chinese nuclear modernization in search of nuclear-strategic parity or superiority compared to the United States and Russia is improbable and, from the Chinese perspective, pointless. From a broader diplomatic and military perspective, it appears the time has arrived for a triangular relationship instead of a two-sided dialogue on strategic nuclear arms reductions or limitations. SSQ

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Notes

1. See Bernard D. Cole, "Island Chains and Naval Classics," *Proceedings Magazine* 140, no. 11 (November 2014): 68–73.

2. Jeremy Page, "Deep Threat: China's Submarines Add Nuclear-Strike Capability, Altering Strategic Balance," *Wall Street Journal*, 24 October 2014, http://online.wsj.com/articles/chinas-submarine-fleet-adds-nuclear-strike-capability-altering-strategic-balance-undersea-1414164738.

3. David Lai, "The Agony of Learning: The PLA's Transformation in Military Affairs," in *Learning by Doing: The PLA Trains at Home and Abroad*, ed. Roy Kamphausen, David Lai, and Travis Tanner (Carlisle, PA: Strategic Studies Institute, US Army War College, November 2012), 369.

4. See United States-China Economic and Security Review Commission, *Dr. Mark B. Schneider, Testimony before the U.S.-China Economic and Security Review Commission, Hearing on Developments in China's Cyber and Nuclear Capabilities*, 26 March 2012, http://www.uscc.gov/sites/default/files/3.26.12schneider.pdf.

5. See Timothy L. Thomas, *Three Faces of the Cyber Dragon: Cyber Peace Activist, Spook, Attacker* (Fort Leavenworth, KS: Foreign Military Studies Office, 2012). Of special interest is chapter 2, "China and Information Deterrence," 39–66. See also Michael S. Chase, "Second Artillery in the Hu Jintao Era: Doctrine and Capabilities," in *Assessing the People's Liberation Army in the Hu Jintao Era*, ed. Roy Kamphausen, David Lai, and Travis Tanner (Carlisle, PA: Strategic Studies Institute, US Army War College, April 2014), 331. Chase notes specifically that Second Artillery has benefited from the expansion and improvement in C4ISR capabilities.

6. Paul J. Bracken, *The Second Nuclear Age: Strategy, Danger, and the New World Politics* (New York: Henry Holt and Co./Times Books, 2012), 206.

7. For a discussion of this, see Lai, "The Agony of Learning," 364–65.

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12. Martin C. Libicki, *Conquest in Cyberspace: National Security and Information Warfare* (New York: Cambridge University Press, 2007), 39–43. See also Colin S. Gray, *Making Strategic Sense of Cyber Power: Why the Sky Is Not Falling* (Carlisle, PA: Strategic Studies Institute, Army War College Press, April 2013).

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14. On the issue of nuclear deterrence as between Israel and Iran, see Steven R. David, *Armed and Dangerous: Why a Rational, Nuclear Iran Is an Unacceptable Risk to Israel*, Mideast Security and Policy Studies No. 104 (Ramat Gan, Israel: Began-Sadat Center for Strategic Studies, Bar-Ilan University, November 2013), http://www.besacenter.org.

Revealed Preference and the Minimum Requirements of Nuclear Deterrence

Dallas Boyd

Abstract

US national security policy features a striking inconsistency in its leaders' tolerance for the risk of nuclear terrorism and nuclear war respectively. Policies concerning the former suggest an overwhelming aversion to the risk of a nuclear attack. By contrast, US offensive nuclear capabilities, which are configured for preemptive counterforce strikes, imply at least some tolerance for the risk of nuclear retaliation. Yet this retaliation could be many times more severe than an act of nuclear terrorism—an event that American leaders suggest is intolerable. A further inconsistency is that the conventional criteria for a successful first strike only account for an enemy's constituted nuclear weapons. This differs from the standard that governs US counterterrorism policy, which holds that the mere possession of fissile material constitutes a nuclear capability. A more consistent nuclear doctrine would consider that any state capable of engineering a single nuclear detonation on American soil may be able to deter the United States. If internalized uniformly, this low damage tolerance could preclude many scenarios involving preemptive attacks, which in turn may cast doubt on the United States' ability to exercise nuclear coercion.

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More than 40 years ago, National Security Advisor McGeorge Bundy noted the existence of "an enormous gulf between what political leaders really think about nuclear weapons and what is assumed in complex calculations of relative 'advantage' in simulated strategic warfare." He considered analysts who spoke of "acceptable" damage running into the tens of millions of lives to inhabit an "unreal world." In reality, Bundy believed "a decision that would bring even one hydrogen bomb on one city of one's own country would be recognized in advance as a catastrophic

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blunder."[1] Yet, at the time of his writing, the United States and the Soviet Union were still fearful of falling victim to the other's first-strike superiority, and at the end of the Cold War, more than 20 years later, each side continued to deploy more than 10,000 strategic weapons.[2]

The gulf that Bundy described persists in the present day, even as the number of warheads in the major powers' arsenals has sharply receded. However, the veil shrouding what American leaders really think about nuclear weapons has partly lifted, exposing a vast divergence between their apparent views and US nuclear doctrine. Nowhere is this divide more striking than in these leaders' attitudes toward the risk of nuclear terrorism and the risk of nuclear war. If the rhetoric of many US officials is to be believed, a terrorist nuclear attack would represent an almost inconceivable calamity. "Just one nuclear weapon exploded in a city," Pres. Barack Obama has argued, would devastate "our very way of life" and constitute nothing less than "a catastrophe for the world."[3]

Together with the range of defenses against this threat, these statements suggest a pronounced aversion to the risk of a nuclear attack. By contrast, the US nuclear posture features substantial offensive nuclear capabilities, implicitly accepting the risks that would attend a nuclear attack *initiated by the United States*. Indeed, some analysts have asserted that the United States is intentionally pursuing "nuclear primacy"—the ability to eliminate an enemy's nuclear forces entirely in a first strike.[4] Yet, the exercise of this advantage would expose the nation to the risk of retaliation far more severe than a terrorist nuclear attack—an outcome that its leaders suggest is intolerable. What explains this contradiction?

There are two principal explanations. One is that these differing risk tolerances are highly circumstantial and thus cannot be compared. According to this logic, the offensive use of nuclear weapons would be considered only in defense of a truly vital national interest, which would naturally require a higher tolerance for risk than would be operative in peacetime.[5] The risk of nuclear terrorism, by contrast, does not shift dramatically in response to US actions, nor would a decision that increases this risk be offset by a potential reward. This distinction argues against a uniform risk tolerance, even if both scenarios may involve a nuclear detonation on American soil. However, it strains credulity to believe that such wildly divergent attitudes toward a nuclear attack could consciously coexist in decision makers' minds. Far more likely is the second explanation: that one of these attitudes is insincere. Either US leaders

are less fearful of a terrorist nuclear attack than their policies and rhetoric imply or they retain offensive capabilities that their appetite for risk should never allow them to employ.

Ascertaining their true risk tolerance borrows from the economic theory of "revealed preference," which holds that consumer tastes are discernible from purchasing behavior.[6] Various US security policies serve a similar function, telegraphing American leaders' aversion to the risk of a nuclear attack. The most obvious of these policies are countermeasures against nuclear terrorism, such as programs to secure fissile material abroad and scan for radiation at maritime ports. Other signals include US nonproliferation and counterproliferation efforts, the doctrine of preventive war, and the pursuit of ballistic missile defenses. Each of these policies shares a common denominator in the belief that even one bomb in the hands of an enemy that cannot be deterred poses an unacceptable threat.

This commonality has a profound but overlooked implication for the offensive use of nuclear weapons. Because a nation subjected to a first strike may no longer have reason to be deterred, its leadership might fairly be considered "undeterrable" as well. Furthermore, by the standard of US counterterrorism policy, which considers the mere possession of fissile material to equal a nuclear capability, even a first strike that eliminated an enemy's nuclear weapons completely would not neutralize its ability to retaliate. It follows logically that the United States' risk aversion concerning terrorists and pariah states should inform its stance toward *any* adversary with a nuclear capability.

This article therefore has two objectives. The first is to contend that US leaders' aversion to the risk of nuclear terrorism reflects their fundamental view of a nuclear attack. The second is to scrutinize the notion that an enemy's capacity for nuclear retaliation can be neutralized with such confidence as to overcome this extreme intolerance for risk. This exercise sheds light on a question that has been debated since the beginning of the nuclear age: What is the minimum number of nuclear weapons that is necessary to deter? In the case of the United States, the answer is clear. Any state that can engineer a single detonation in an American city may be able to immunize itself from nuclear coercion, much less nuclear attack. This conclusion calls into question virtually every function of the US nuclear arsenal save its most basic—deterring a nuclear attack on the United States. Any use of US nuclear weapons beyond this

limited purpose requires the resolve to risk nuclear retaliation—a resolve American leaders do not appear to possess.

The case for this proposition begins by cataloging the policies that reveal US leaders' abhorrence of the prospect of a nuclear attack. It then examines the evidence that US nuclear forces and related capabilities are oriented toward preemptive counterforce strikes and questions the belief that such an attack can be conducted with acceptable risk. The analysis draws on the concept of delayed retaliation using unconventional delivery means, such as those commonly associated with nuclear terrorism. Because these modes of attack are no less useful to governments than terrorists, they may provide a second-strike capability that fulfills the basic requirements of deterrence. The analysis also considers the circumstances in which a nuclear-capable state might be self-deterred from retaliating after a nuclear attack. Finally, it discusses implications for the US nuclear posture.

Revealed Preference in US National Security Policies

That a consensus exists on the unacceptability of a nuclear attack is perhaps unremarkable. Yet, the breadth of policies that reflect this view is so wide, and their influence on the United States' strategic conduct so profound, they cannot but reveal an utter intolerance for this risk. Among these policies is the wide-ranging effort to slow the spread of nuclear weapons, which has led successive administrations to confront North Korea, Iraq, Iran, Libya, and others over their illicit nuclear programs. Several of these countries have also figured in the decades-long pursuit of ballistic missile defenses. Most tellingly, the United States led the overthrow of Saddam Hussein's regime in part over concerns the Iraqi dictator had resumed his pursuit of nuclear arms.

Underlying these diverse policies is the concern that the threat of punishment alone might not deter an attack on the United States—a fear that continues to animate the US response to Iran's nuclear ambitions. Because deterrence may not afford the same protection against certain adversaries as it does against the established nuclear powers, the United States expends enormous effort on alternative means to cope with these problem states.[7] The fear of undeterrable actors is especially palpable in regard to would-be nuclear terrorists, and nowhere is the fear of these weapons more plainly revealed than in US leaders' distress over the terrorist threat.

Nonproliferation, Counterproliferation, and Preventive War

The United States' two major political parties share the belief that a nuclear detonation on US soil would radically alter the American way of life. However, the preferred responses to this threat diverge sharply. The left has tended to favor the nuclear nonproliferation regime, while the right has emphasized counterproliferation policies. Ironically, both approaches have partly been necessitated by earlier US policies that enabled the spread of nuclear technology. In the 1950s, the United States launched the Atoms for Peace program to supply nuclear reactors, fuel, and scientific training to developing countries pursuing nuclear energy.[8] Indeed, this policy enabled the early nuclear programs of Iran, India, and Pakistan—three countries that have presented perennial challenges to the nonproliferation regime.[9] Following India's 1974 detonation of a "peaceful nuclear explosion," which illustrated the inadequacy of the Atoms for Peace program's nonproliferation safeguards, the United States began to reverse course and has sought to control access to nuclear technology and materials ever since.[10]

On the extreme end of the containment spectrum is the doctrine of preventive war, under which a state reserves the right to eliminate a catastrophic threat before it materializes. Pres. George W. Bush pressed for the invasion of Iraq on this basis, declaring that the United States could not wait for proof of Iraq's nuclear program to come "in the form of a mushroom cloud."[11] While the fear of an unprovoked nuclear strike helps explain these policies, there is an additional explanation: US leaders are concerned that nuclear weapons in the hands of pariah states would impose unacceptable constraints on American freedom of action abroad. As Bruce Blair and Chen Yali argue, these policies reflect an understanding that the United States can be deterred with even the most "primitive and diminutive of nuclear arsenals." This recognition explains why the United States "goes to such extraordinary lengths to prevent adversaries from acquiring even one solitary bomb in the first place."[12]

Ballistic Missile Defense

Failing efforts to stop the spread of nuclear weapons, the United States has pursued another countermeasure in the form of ballistic missile defenses. The debate over this system, while intensely partisan, features a revealing intersection of belief between opponents and advo-

cates. Proponents such as Richard Perle contend that without missile defenses, "we are vulnerable to any country or movement that manages to obtain even a single missile capable of reaching the United States."[13] Skeptics counter that the system could easily be circumvented and that no responsible leader would ever gamble a single city on the failure of alternative means of attack. As Charles L. Glaser and Steve Fetter argue, "even a small probability of having one US or allied city destroyed by a rogue nuclear weapon would be too large to warrant . . . overthrowing a rogue leader."[14] Thus, the debate is illuminating not for its insight into the system's reliability but for making explicit US leaders' maximum damage tolerance—a single nuclear detonation on American soil. If any confirmation of this conviction were needed, it emerged in the widespread anxiety over nuclear terrorism in the post-9/11 era.

Nuclear Terrorism

After the terrorist attacks on the US homeland, the fear of an even greater catastrophe consumed policy makers and the public alike. Expert commentary on the probability of a terrorist nuclear attack and ever more lurid descriptions of its effects flamed this dread. One widely cited study estimated that a single 10–kiloton device detonated in New York City would kill as many as 500,000 people.[15] Assessments of this sort led to a rare convergence of opinion among US leaders, which Pres. Barack Obama captured in his description of nuclear terrorism as "the single biggest threat to US security."[16] Accordingly, preventing nuclear proliferation and nuclear terrorism figured prominently in the president's 2009 Prague speech, and these objectives were first among the five priorities listed in the 2010 *Nuclear Posture Review*.[17]

While such messaging conveys an unmistakable horror of nuclear terrorism, the true measure of how seriously leaders take this threat lies in the policies they have enacted to guard against it. Foremost on this list are efforts to place nuclear materials beyond the reach of terrorists, a practice that had its origins in the Cooperative Threat Reduction program to secure nuclear weapons and materials in the former Soviet Union. Later policies would expand on this model, including programs to consolidate separated plutonium in secure locations and convert civilian research reactors to low-enriched uranium fuels. The United States also operates an array of programs to detect the smuggling of nuclear weapons and materials around the world. Under the Second Line of Defense, for example,

radiation detectors have been installed at nearly 500 border crossings and airports in the former Soviet Union. The Megaports Initiative operates detectors at ports in more than a dozen countries in Europe, South America, Southeast Asia, and the Caribbean, while the Secure Freight Initiative conducts scanning at ports in Pakistan, Honduras, Singapore, South Korea, Oman, and the United Kingdom. Likewise, some 1,400 radiation portals have been installed at US ports, which complement various domestic tools to detect nuclear devices. Finally, the United States maintains a global intelligence network to monitor for materials trafficking and terrorist activity relating to nuclear weapons.

The breadth and expense of this architecture should underscore the United States' consummate fear of a nuclear attack. However, the implications of this fear are not limited to terrorists and pariah states. It may also have powerful but underrecognized effects on the outcomes of crises between the United States and other major nuclear powers. Prevailing in standoffs with these states depends in part on the projection of resolve, particularly when the use of nuclear weapons is at stake. In this situation, discernible anxiety over even a limited nuclear attack undermines the US bargaining position. This fear does particular harm to the credibility of nuclear threats, which are thought to confer coercive leverage in crises. This is so because such threats require their issuer to appear willing to follow through with a first strike, which in turn requires a willingness to risk some level of damage in retaliation. As Herman Kahn argued, in the nuclear arena "credibility depends on being willing to accept the other side's retaliatory blow. It depends on the harm he can do, not the harm we can do."[18] Nuclar coercion will not succeed if the threatened state perceives its antagonist's damage tolerance to be extremely low and the defender can credibly deliver this level of punishment. Because American leaders may have unwittingly advertised their maximum damage tolerance in the horror they assign to a single nuclear detonation, there is reason to doubt the effectiveness of US nuclear threats.

That US leaders believe they can simultaneously deter nuclear rivals while threatening aggression stems from an artificial distinction between two types of adversaries. In the first category are states—principally Russia and China—with which the United States maintains classic deterrence relationships. The second group is comprised of potentially undeterrable actors against whom US policies on nonproliferation, missile defense, and nuclear counterterrorism are oriented. Yet, this distinc-

tion has little bearing where the *offensive* use of nuclear weapons is concerned. In many scenarios, a state subjected to a nuclear attack would have little left to lose, making its leaders no less constrained in retaliating than terrorists would be in attacking outright. Thus, the risk aversion that informs US policy toward the latter should arguably figure in any consideration of an attack on a nuclear power. Overlooking this essential similarity is a significant failure of logic—one that permits a potentially destabilizing emphasis on offensive nuclear capabilities.

The Conceit of Nuclear Primacy

The pioneers of nuclear deterrence theory surmised that a nation would not attack an enemy's cities with nuclear weapons because its own cities would inevitably be destroyed in turn and no advantage would be gained from striking first. Thus, these weapons offered some promise of stability. However, this optimism was soon extinguished by the ballistic missile, the accuracy of which theoretically enabled an enemy's nuclear forces rather than its population centers to be destroyed. Under such an attack, retaliation might be avoided altogether, presenting an incentive to launch a disarming strike. The danger of this temptation defined the brief but terrifying period before the United States and the Soviet Union came to accept their mutual vulnerability, which many scholars consider to have occurred around the time of the Cuban missile crisis. While both sides maintained offensive attack plans for decades afterward, strategists generally accepted that striking first would be successful only if the attacker faced a manageable number of weapons, knew their precise number and location, and could destroy them before they were fired or relocated.[19] A modicum of "first-strike uncertainty" about these conditions or a "seed of doubt" in the minds of decision makers was deemed sufficient to deter.[20]

Since the end of the Cold War, however, the development of certain US capabilities has hinted that this hard-won appreciation of mutual deterrence has eroded. In 2006 scholars Keir Lieber and Daryl Press created a sensation in the nuclear policy world when they argued that, as a result of increasing missile accuracy and other advances, the United States was fast approaching an era of "nuclear primacy." Under this paradigm, US leaders would have the "ability to destroy all of an adversary's nuclear forces" in a preemptive strike.[21] To support this assertion, Lieber and Press modeled a US nuclear attack on Russia and concluded that

the United States would have "a good chance" of completely eliminating Russia's intercontinental ballistic missiles (ICBM), heavy bombers, and ballistic-missile submarines. Consequently, they argued that Russia's leaders "can no longer count on a survivable nuclear deterrent." Lieber and Press asserted that China is even more vulnerable, calculating in a separate model that the probability of a US attack destroying every one of China's 20 silo-based ICBMs stood at "well above 95 percent."[22]

Members of the nuclear establishment hotly deny that the United States is pursuing a disarming first-strike capability. Strategist Keith Payne, for example, argues that Lieber and Press's work represents a "gross mischaracterization of US policy," citing as evidence declassified documents and authoritative statements by government officials.[23] However, deducing the orientation of the US arsenal toward preemptive attacks requires no explicit acknowledgement to that effect. Inferences can be made about a state's intended use of nuclear weapons from the size and structure of its arsenal and other related capabilities. Aside from the high accuracy of its missiles, the United States has developed numerous platforms with unmistakable first-strike applications, among them stealth bomber aircraft to penetrate enemy air defenses, space-based systems to track mobile missiles, and precision conventional munitions to destroy command and control facilities. The breadth of US investment in intelligence capabilities for a first strike is especially telling.[24] Analysis of such capabilities led a team of RAND Corporation analysts to the obvious conclusion that beyond central deterrence, US strategic forces appear "best suited to provide . . . a preemptive counterforce capability against Russia and China." Absent this mission, the size and operational doctrine of the nuclear posture "simply do not add up."[25]

While these capabilities are undoubtedly impressive, they reflect a premise that appears to be greatly out of step with US leaders' revealed preference concerning risk. The conceit of nuclear primacy is the notion that destroying a state's nuclear forces-in-being, and particularly its ICBMs, is synonymous with eliminating its capacity to retaliate. Christopher Chyba and J. D. Crouch capture this misconception in their definition of nuclear primacy as the ability to launch a "confident and disarming nuclear first strike . . . such that no retaliation with *strategic nuclear forces* would be possible" (emphasis added).[26] Nor is this myopia limited to American strategists. Chinese scholars Li Bin and Nie Hongyi worry that some US thinkers are "certain the United States can rely

on a preemptive nuclear strike to completely destroy China's *long-range nuclear weapons*" (emphasis added).[27] These writings tend to underplay, or ignore altogether, unconventional means of delivering retaliatory weapons.[28] As such, they betray a basic misunderstanding of the requirements of a successful first strike—at least for an attacker whose damage tolerance is exceedingly low.

As American leaders' rhetoric and policies continually imply, even a modest retaliatory blow would far exceed their stated maximum damage tolerance: a single nuclear detonation. To avoid this risk, a US first strike would have to be quite splendid indeed, destroying not only long-range weapons but also medium- and short-range missiles and nonstrategic warheads. Additionally, nondeployed and inactive warheads would have to be eliminated, for if even one survived, a counterstrike on an American city would be distinctly possible. Yet, by the standard that governs US policies toward terrorists and pariah states, destroying an enemy's constituted weapons would still be insufficient. True nuclear primacy would also require the elimination of a state's nuclear infrastructure and fissile material stocks because these assets could eventually be used to effect a crude form of retaliation. Given that their destruction would be virtually impossible, nuclear primacy is a pursuit fraught with the potential for catastrophe—a conclusion with profound implications for the minimum requirements of deterrence.

Deterrence: Defining Adequacy Down

In determining the appropriate size and composition of a nuclear arsenal, two divergent schools of thought contend. According to the first view, a delicate balance of terror exists between nuclear rivals that can only be maintained if both sides can impose intolerable damage on the other even after absorbing a first strike.[29] This task is thought to require substantial, highly survivable arsenals and stringent operational protocols to govern their use. The US and Russian nuclear postures reflect this view, although considerable scholarship has documented the extent to which factors other than strategic necessity drove the growth of their arsenals during the Cold War. Among these factors were inter- and intraservice rivalries in both countries and bald political posturing, typified by the US political debate over the "missile gap."[30] Similarly, institutional inertia largely explains the maintenance of nuclear stockpiles today that are similar in configuration if not in size to Cold War postures

a generation after that conflict ended. Thus, these arsenals should not be seen as expressions of either nation's true deterrence needs, nor should they nurture the presumption that the strength of deterrence is proportional to the size of one's stockpile.

The opposing school of thought, often referred to as "minimum deterrence," posits that stability is achieved with a relatively small nuclear force and that little, if any, marginal benefit accrues with each additional warhead. Indian defense specialist Rajesh Basrur describes this view as the understanding that "it is not necessary to have large numbers of sophisticated weapons to deter nuclear adversaries; that nuclear 'balances' are not meaningful; and that weapons need not be deployed and kept in a high state of readiness in order that deterrence be effective."[31] Some scholars believe that an even more modest nuclear posture can meet a state's deterrence needs. These advocates of "virtual nuclear arsenals" argue that the latent capability to build nuclear weapons may be sufficient to deter—a concept that will be revisited later in this article.[32]

China's nuclear arsenal is clearly an expression of the minimalist school. Taylor Fravel and Evan Medeiros describe the Chinese deterrent as one that offers simply "assured retaliation," which reflects the belief that "a small number of survivable weapons would be enough to retaliate and impose unacceptable damage on an adversary."[33] As Chinese Maj Gen Pan Zhenqiang puts it, "as long as you are able to give a devastating counter-attack against one or two US big cities, the scenario [is] enough to make the attacker who had the intention of preemptive nuclear strike pause, and hopefully drop [an attack] plan."[34]

Minimum deterrence is not without its critics, of course. Lieber and Press dispute the "notion that deterrence will hold as long as countries face the mere possibility of losing a single city," which they insist is "not well supported by historical evidence." Citing the outbreaks of the First and Second World Wars, they argue that conflicts "always begin with at least one country taking a tremendous risk, and these gambles are often bigger than the terrible prospect of losing a city."[35] Nuclear policy analyst Ward Wilson goes further, asserting that the *actual* destruction of cities has failed to impress leaders throughout history.[36] He cites as evidence a revisionist explanation for Japan's surrender in World War II, which credits the Soviet declaration of war as the crucial factor in that decision rather than the atomic bombings, which were simply extensions of a bombing campaign that had already devastated Japan's cities.[37]

From this data point, Wilson contends that city destruction has no effect on decision making, which, he claims, undermines the very premise of nuclear deterrence. "If destroying one or two cities does not coerce an opponent," he writes, "then perhaps the threat of limited nuclear retaliation does not deter when the stakes are high enough."[38]

It is telling that those who assert leaders' wild risk tolerances must reach back seven decades for confirming evidence to this effect. Indeed, Wilson asks us to accept that the callousness of Japan's leaders—the wartime rulers of a martial culture—is instructive of deterrence calculations in the present day. On the contrary, many foreign strategists now believe that weapons in the low single digits are quite adequate for deterrence. To wit, several scholars at India's Institute for Defence Studies and Analyses endorse the most minimal deterrent against China. Swaran Singh, for instance, "advocates the targeting of five cities," while Sujit Dutta is "of the opinion that China would be deterred if . . . its adversary could destroy even three major cities."[39] The late K. Subrahmanyam, arguably India's most respected nuclear strategist, set the bar lowest of all, writing that "it is now recognized that one bomb on one city is unacceptable."[40]

Central to the question of the minimum requirements of nuclear deterrence are the criteria for a deterrent force to be considered "credible." Conventional wisdom holds that several characteristics are necessary to apply this label, among them survivable second-strike weapons and command and control facilities. However, the definition of a second-strike weapon is somewhat nebulous. At the most basic level, a state is "nuclear capable" if it has sufficient fissile material and expertise to build a nuclear explosive device. The next level is achieved when a state actually builds said device. More credible still is a confirmation to that effect in the form of an explosive test, along with a demonstrated means of delivery such as a ballistic missile.[41] Finally, a state may take measures to place its weapons beyond the reach of an enemy attack, usually by deploying them on mobile launchers or submarines or within hardened missile silos. Victor Cha, who served as a policy adviser on the National Security Council during the George W. Bush administration, presents two additional criteria in an analysis of North Korea's deterrent: a proven missile reentry capability and evidence of warhead miniaturization. Without these capabilities, he writes, Pyongyang's small arsenal "does not come close to a credible nuclear deterrent," and the regime "gets no added security from these weapons."[42]

If the United States' anxiety over nuclear terrorism is any guide, these requirements vastly overstate the threshold for credibility. After all, the fear that North Korea might transfer a nuclear weapon to terrorists has been central to the case for reversing its nuclear program. If these weapons pose a catastrophic threat in the hands of extremists, on what basis should they be considered less threatening when deployed by their original owners? In truth, Pyongyang can have confidence in its minimalist posture for two reasons. First, contrary to the emphasis placed on strategic delivery vehicles, such platforms are not necessary for nuclear retaliation. In extreme circumstances, a variety of unconventional delivery means can be used. As the late political scientist Kenneth Waltz observed, "Everybody seems to believe that terrorists are capable of hiding bombs. Why should states be unable to do what terrorist gangs are thought to be capable of?"[43] Second, no arbitrary deadline exists for a state to respond to a nuclear attack. Retaliation may come weeks or even months after a first strike, providing ample time to prepare nondeployed warheads or even construct a makeshift weapon from available nuclear material. Together these concepts call into question the key assumption on which nuclear primacy rests: that a nuclear counterstrike must come immediately and in the form of ballistic missile attacks, or not at all. This questionable premise permits US leaders to entertain first strike scenarios that are wildly at odds with their apparent tolerance for risk.

Delayed—But Assured—Retaliation

During the Cold War, it was widely assumed that the United States and Soviet Union would launch a substantial portion of their arsenals the moment either believed itself to be under nuclear attack. Today retaliation may occur at a more plodding pace, in part because military imbalances are much more pronounced. A US first strike might virtually eliminate an enemy's deployed weapons, requiring considerable time and effort for the state to respond. Additionally, delay is implicit in "no first use" policies, which commit a state not to use nuclear weapons except in retaliation for a nuclear attack. One such state is India, the nuclear strategy of which scholar Ashley Tellis describes as emphasizing "delayed—but assured—retaliation." This posture reflects the belief that "for purposes of deterrence, the ability to retaliate with certainty is more important than the ability to retaliate with speed."[44]

US planners' dismissal of this posture generally centers on doubts about the "certainty" of assured retaliation. According to this line of thinking, no state can be completely confident of its second-strike capacity, especially if elaborate precautions are not taken to preserve it. Yet, this view conflicts with the basic premise of US counterterrorism policy, which emphasizes fissile material rather than assembled weapons as the most basic nuclear threat. As the National Research Council notes, lack of access to this material is the "primary impediment that prevents countries or technically competent terrorist groups from developing nuclear weapons."[45] Its mere possession, on the other hand, confers significant deterrent value even in nonweapon form. Indeed, Albert Wohlstetter, Gregory Jones, and Roberta Wohlstetter present the case of a state that is losing a short conventional war but possesses plutonium "in explosive concentrations" along with the "capability of assembling an implosion system." In light of this combination, they write, "from the standpoint of the adversary who had been winning, it would be facing a government which to all practical effect had nuclear weapons."[46]

By this standard, possession of fissile material alone ensures that a state can never truly be disarmed. Even after a highly successful first strike, the defender could use its surplus plutonium or highly enriched uranium to develop a crude retaliatory weapon, which it could then deliver using unconventional means. Only a small quantity of this material is needed, as US leaders frequently admonish. President Obama has warned that a mass of plutonium "about the size of an apple" would threaten hundreds of thousands of people.[47] The International Atomic Energy Agency defines a "significant quantity" of plutonium—the approximate amount needed to produce a nuclear explosive device—as 8 kg.[48] This unit of measurement should be kept in mind in any discussion of a disarming strike on China, which possesses roughly 1.8 *tons* of weapons-grade plutonium.[49]

Of course, it is far from certain that a nation subjected to a nuclear first strike would succeed in developing and delivering a crude retaliatory weapon to its enemy's territory. However, necessity has always produced remarkable improvisation during wartime. After a nuclear attack, a state could devise unorthodox methods of retaliating, which suggests that credibility, that "magic ingredient" of deterrence, might be purchased more cheaply than is commonly supposed.[50]

Unconventional Delivery Modes

The concept of delivering nuclear weapons clandestinely dates to the earliest days of the nuclear age, when analysts imagined a range of exotic delivery means. In 1947, for example, the Federal Bureau of Investigation speculated that "a complete atom bomb could be smuggled into the United States as freight . . . and the bomb could be detonated by remote control."[51] As the Cold War progressed, both the United States and the Soviet Union developed man-portable nuclear weapons and the protocols for delivering them.[52] In the last two decades, unconventional delivery modes have often been discussed in scenarios involving terrorists and pariah states. In particular, this possibility has figured in the debate over missile defense, with opponents claiming that a state could easily circumvent the system using watercraft, pre-positioned nuclear devices, and the like.

More recently, this concept has been revisited in the context of nuclear war between the great powers. In the debate over Lieber and Press's analysis, for instance, Jan Lodal, former principal deputy undersecretary of defense, suggested that nuclear weapons could be smuggled into the United States on "pleasure boats" as a means of ensuring a second-strike capability. He conceded that this form of attack could not be used to defeat the United States but argued that the "possibility of [water-borne retaliation] does make the idea of a totally disarming attack against an adversary's nuclear forces nonsense."[53] While skeptics tend to dismiss these scenarios as the product of overactive imaginations, this bias stems from the odd perception that annihilating cities with megaton-class weapons is at once more credible and somehow more respectable than delivering Hiroshima-size bombs clandestinely. Another source of skepticism is the belief that such delivery means simply offer less deterrent value than traditional modes of attack. As the National Intelligence Council (NIC) observes, the former "do not provide the same prestige, deterrence, and coercive diplomacy as ICBMs." However, the NIC swiftly contradicts itself by noting that the United States is more likely to be attacked using nonmissile means because they are "less costly, easier to acquire, and more reliable and accurate."[54] Setting aside this logical contradiction, it may be true that analysts do not associate reliability with deterrent value. However, if they do not, a weaker state could correct this misperception in various ways, including by conducting highly visible military exercises to demonstrate the efficacy of unconventional delivery means.

As with constructing a makeshift device, delivering a nuclear weapon clandestinely would pose significant challenges. Not least, shipborne bombs would be vulnerable to interdiction, and if the United States had intelligence that this mode of retaliation were being pursued, it would take extraordinary measures to defend itself. However, the intensity of this effort could not be sustained for long, and an adversary willing to wait months before retaliating would have a reasonable chance of succeeding. Even if the odds of success were objectively low, the stakes involved would demand worst-case scenario planning. Conservative leaders would have to assume that the bomber will always get through.

Deterrence and Self-Deterrence

If a source of reassurance exists that unconventional retaliation would not occur after a "splendid" first strike and that US nuclear threats still provide coercive leverage, it lies in the distinction between capability and intent. Simply because a state *could* retaliate in this manner does not mean that it would. For a variety of reasons, leaders may be self-deterred from retaliating—even if the means to do so were available and the justification ironclad. First, because these delivery means require countervalue targeting, that is, the mass killing of civilians, this option may not be considered palatable. Second, the weaker side might refrain from retaliating for fear of being annihilated in counterretaliation. If the stronger party believed that either of these considerations was prohibitive, it might still attempt coercion or outright attack, despite the weaker state's possession of a latent nuclear capability. These factors must therefore be carefully examined before a more complete judgment of the utility of US offensive capabilities can be rendered.

The Credibility of Countervalue Retaliation

In considering unconventional delivery means, most discussion of credibility centers on technical matters, such as whether shipborne weapons can escape interdiction. However, the deterrent value of this attack mode also hinges on credibility of a different sort—whether a decision to retaliate in this manner would really be made. The credibility of countervalue targeting has long troubled nuclear strategists who fear that threats to murder large numbers of noncombatants are simply not

believable. This apprehension contributed in part to the adoption of counterforce targeting in US nuclear doctrine.

Whether this concern would apply to countervalue *retaliation* is unclear. China's nuclear strategy implicitly involves city destruction, given the limited quantity and accuracy of its long-range weapons. However, qualitative differences between missile attacks and unconventional delivery modes suggest that a discrete use calculation might apply. Not least, an indiscriminate attack against civilians weeks or even months after a provocation would seem particularly cold-blooded. Nonetheless, the credibility threshold for retaliation is presumably far lower than for initiating nuclear war, and one line of thinking in particular may permit recourse to countervalue strikes despite moral qualms about them.

Counterforce capabilities are the luxury of states that spend lavishly on offensive arms, whereas a minimalist posture is the strategy of a more restrained nuclear power. In the event of a nuclear attack, members of the latter group cannot in fairness be expected to refrain from their only available means of retaliating. This would amount to penalizing the victim for adopting a more stable and responsible nuclear posture than its aggressor. Thus, any civilian deaths that result from such a state's retaliation can be laid squarely at the feet of the initiator of the nuclear exchange.

There are at least two scenarios where the justification for countervalue retaliation would be difficult to deny: a preemptive nuclear attack on a state's strategic forces or a conventional invasion.[55] In these scenarios, nuclear retaliation might be permissible for the reason outlined above: the more powerful side cannot dictate the terms under which its aggression can legitimately be answered. Nonetheless, no amount of sophistry can obscure the barbarism of nuclear strikes on population centers. A state retaliated against in this manner may very well escalate, especially if its leaders viewed the precipitating attack as having had limited aims. Their reaction may take the form of a grossly disproportionate counter-retaliation—the fear of which constitutes a second potential source of self-deterrence.

The Influence of Escalation Dominance

For more than a half-century, strategists have speculated on the effect of significant nuclear imbalances during crises. In 1959 Bernard Brodie considered the following scenario: "Let us assume that a menaced

small nation could threaten the Soviet Union with only a single thermonuclear bomb, which, however, it could certainly deliver on Moscow if attacked." Brodie concluded that this capability would be "sufficient to give the Soviet government much pause."[56] However, the possession of a deliverable weapon is only one ingredient in the recipe for nuclear deterrence. No less important is the aggressor's belief that the defender will actually use it. The threat to do so is thought to lack credibility if the power differential between the two sides is too pronounced. In this circumstance, the stronger state may believe that it can conduct a limited attack—striking only military targets, for instance—while threatening an unrestrained attack on cities if the weaker state responds. This advantage is referred to as *escalation dominance*, which Forrest Morgan and his peers at RAND define as "a condition in which a combatant has the ability to escalate a conflict in ways that will be disadvantageous or costly to the adversary while the adversary cannot do the same in return."[57] If an aggressor enjoys this position, the weaker state may be perceived—and perceive itself—as being unable to retaliate even if it has the technical means to do so. At least one nuclear-weapon state is known to have debated this dilemma, and the conclusion of its leaders appears to call into question Brodie's verdict.

In the 1970s and 1980s, South Africa secretly developed six nuclear bombs, ostensibly to counter the threat from Soviet- and Cuban-backed rebels in Angola. However, some of its leaders doubted that these weapons could credibly deter a communist invasion. In this scenario, South Africa's strategy called for a series of graduated signals to alert the Soviets that it possessed nuclear weapons, culminating in an explicit threat to use them on the battlefield. Yet, there was no agreement on what to do if this threat failed. One South African official felt that it would be advisable at that point to "throw in the towel, and let the Soviet Union take us," because to do otherwise would have been a "suicidal act." The Soviets would have "every excuse then to actually attack us with nuclear weapons. . . . Then we would still lose, but we would destroy the country and the people as well."[58]

This anecdote seems to undercut the idea that a rudimentary deterrent is adequate against a much stronger nuclear power. It suggests that as long as a preemptive attack spares something that the weaker state values (for example, its cities or its leaders' grip on power), that government cannot retaliate without fear of losing what remains. However, the

fatal flaw in this logic is the assumption that leaders will always make rational decisions, even after suffering a national trauma. This is a condition that US decision makers could never take for granted. To resist coercion or deter an attack, the weaker side must simply create uncertainty about whether it would retaliate with nuclear weapons despite a great imbalance in strength. For a desperate or fanatic regime, this task would probably not be difficult. History is replete with vanquished governments fighting on after any prospect of victory had expired, and for cultures that place a high premium on "face," absorbing counterretaliation might be preferable to the dishonor of failing to respond at all. Finally, if a first strike were to occur, the aggressor could not assume unitary decision making on the part of its enemy. Military commanders might retaliate without authorization, especially if communication with the central leadership had been cut off. Each of these possibilities should be sufficient to plant a seed of doubt in the minds of American leaders. Given their manifest risk intolerance, even the smallest uncertainty may effectively render US offensive nuclear forces unusable, and without the credible threat of their use, any attempt at nuclear coercion may in turn ring hollow.

Yet, if US leaders' risk tolerance is indeed prohibitive and their self-deterrence correspondingly high, one might reasonably ask on what grounds counterforce capabilities should be considered dangerous. After all, these weapons are arguably destabilizing only if they are brandished or launched recklessly. However, it should not be assumed that American leaders are immune from cognitive dissonance, especially under the enormous pressure of a nuclear crisis. It is quite possible they have not internalized the contradiction between their risk-averse counterterrorism and counterproliferation policies on one hand and the nation's footing for offensive nuclear war on the other. In a crisis, well-rehearsed nuclear war plans may assume a certain automaticity, in spite of leaders' obvious intolerance for risk in other domains. Further, a rational, considered decision to launch a first strike is not the only plausible scenario in which these weapons might be used.

A counterforce posture, especially when paired with a "launch on warning" policy, necessarily requires high launch readiness, imposing decision windows of perhaps 15–30 minutes upon receipt of satellite and radar warning of an incoming attack. The risk of a premature or mistaken launch under this model is self-evidently higher than under

one designed to ride out a nuclear attack and retaliate with second-strike forces. Nor is the potential for miscalculation limited to a splendid counterforce attack. Consider a scenario presented by Austin Long and Brendan Green in which the United States enters into a limited conventional conflict with a nuclear adversary. In this circumstance, the enemy "would have strong incentives to try and secure their nuclear forces by dispersing them, delegating launch authority, or otherwise increasing readiness." If the United States were decisively winning, these authors suggest, "signs of [its adversary's] increasing readiness or weapons dispersal . . . would create dangerous windows of opportunity on the US side, as American troop concentrations, American allies, or even the American homeland could be potential hostages." Given such high stakes, they argue, "counterforce will likely have advocates in high circles during a crisis."[59]

Far from endorsing these capabilities, this scenario illustrates that US counterforce systems would be the principal driver of the enemy's anxiety about losing its weapons in the first place. Further, movements to secure one's nuclear forces from attack may be mistaken for launch preparations, prompting a counterforce strike and transforming what had been a limited conventional war into a nuclear one. Moreover, the possibility that enemy weapons may prove elusive is no less relevant in this circumstance than in the case of a bolt-from-the-blue attack. As Michael Gerson notes of such a scenario, "In the end, if an attempted disarming first strike leaves some of the adversary's weapons intact, the United States may have started the nuclear war that it had hoped to prevent."[60]

Implications for the United States

Ultimately, this analysis rests on inferences about the true risk tolerance of US leaders and the confidence of their adversaries in both resisting nuclear coercion and retaliating after a nuclear strike. Because neither of these variables can be established conclusively before a crisis occurs, there is room for disagreement about their potential implications. What should be uncontroversial, however, is that widely divergent perceptions of capability and resolve in a crisis may lead to catastrophic misjudgments.[61] Additionally, there should be no doubt that such divergences exist.

Consider the multiple levels of perception that would be operative if the United States attempted nuclear coercion—much less a first strike.

First would be US leaders' confidence in their counterforce capabilities, followed by the enemy's estimation of them. Next would be the enemy's confidence in its ability to retaliate after absorbing a counterforce strike and the United States' assessment of this probability. Beneath these first-order judgments are even more subjective evaluations: American leaders' perception of *the enemy's perception* of US first-strike capabilities, the enemy's perception of *US leaders' perception* of its retaliatory capability, and so on. Mistaken assumptions in any one of these dimensions could result in grave errors. For example, if US leaders are so enamored of their first-strike capabilities that they perceive little risk of retaliation, the threshold for launching a preemptive attack—or merely engaging in nuclear coercion—might be dangerously low. Indeed, this prospect has not escaped foreign strategists. Chinese analysts Li Bin and Nie Hongyi have noted that the limitations of US offensive forces are "not clear enough" to American leaders, creating the possibility that they "may think they have" the capability to neutralize China's retaliatory forces. According to Li and Nie, the Americans' "blind confidence" might give rise to attempts at nuclear saber rattling or worse.[62] Compounding this danger is the possibility that a state subjected to American coercion may believe just as strongly in its own capacity to retaliate. Moreover, if either side believes that the other privately shares its own assessment, they may fatally misjudge the robustness of deterrence. In particular, foreign leaders may take at face value US rhetoric on nuclear terrorism and conclude that the ability to deliver a single bomb is sufficient to deter the United States. In this circumstance, they may discount the gravity of American threats even if they are quite sincere.

Because US offensive capabilities are the chief source of these potential risks, the responsibility arguably falls to the United States to minimize them. One doctrinal option is simply to limit offensive nuclear forces exclusively to damage-limitation roles, that is, reducing the brunt of an enemy attack when it is not merely likely but imminent or under way. Striking first in this scenario requires no great tolerance for risk, because some level of damage is inevitable, and preemption merely reduces that damage as much as possible. However, this option would leave counterforce capabilities intact, offering no assurance that American leaders would forswear preemptive attacks in less than dire circumstances. The most effective means of preventing nuclear aggression—and the terrible risks entailed—is to dismantle counterforce capabilities altogether.

Rejection of Counterforce Targeting

The belief that strategic stability requires the capacity to hold an enemy's nuclear forces at risk is canonical in US nuclear doctrine.[63] However, the logical foundation of this axiom has never been firm. Because counterforce capabilities nourish the reciprocal fear of a surprise attack, their effect during crises may be inherently destabilizing. A state's anxiety over losing its weapons only encourages their precipitate launch, and its enemy's anticipation of this mind-set incentivizes attempts to disarm those weapons first. If neither side could target the other's strategic forces, no such "use or lose" pressures would exist.

The case against counterforce need not be confined to the theoretical realm, however. Well-documented historical episodes illustrate the disconnect between this strategy and national leaders' enthusiasm for employing it. During the 1961 Berlin crisis, Pres. John F. Kennedy considered a first strike against Soviet nuclear forces based on a plan that had been drafted earlier that year. US satellites had revealed that the USSR possessed only *eight* ICBMs, presenting the alluring prospect of a disarming attack. However, even this miniscule retaliatory force was sufficient to discourage Kennedy, who lacked confidence that the Soviet weapons could be completely neutralized.[64] As Fred Kaplan reflects on the incident, "even in those halcyon days of 'strategic superiority,' the most determined American officials, who had firmly believed in the counterforce strategy in theory, did not even contemplate taking the awesome risk of executing the strategy in practice."[65] Strangely, this episode and others like it occasioned no fundamental reevaluation of the US targeting strategy. More than 50 years later, the US nuclear posture is still configured for counterforce strikes, even against states with whom the numerical balance is much less favorable than it was against the Soviets early in the Cold War.

A US nuclear posture that is more consistent with its leaders' tolerance for risk would designate these weapons for an exclusive purpose: deterring a nuclear attack on the United States or its allies with the threat of countervalue retaliation. Many strategists have an allergy to this concept because they consider the presumed targets of these strikes—enemy cities—morally impermissible and the threat to destroy them incredible.[66] However, states do not face a binary choice between targeting missile silos and annihilating civilians. There is a "third way" that removes the dangers of counterforce targeting, while minimizing

the collateral damage of countervalue attacks. This doctrine, which Hans M. Kristensen, Robert S. Norris, and Ivan Oelrich term "infrastructure targeting," would hold at risk critical national assets such as energy nodes, transportation hubs, and fuel refineries.[67] Destroying these targets could seriously threaten an enemy's economy and national cohesion without the instability of counterforce strategies or the moral outrage of targeting population centers. Of course, many infrastructure targets are located in close proximity to urban areas, and it is impossible to adopt a targeting posture that completely spares civilians. Indeed, counterforce targeting, despite its emphasis on military assets, also entails substantial civilian casualties because deadly fallout from a massive attack would cover a wide geographic area. Ultimately, however, the criterion that should commend a targeting posture is not the number of civilian deaths it would produce on paper or whether these deaths are intended or collateral. Rather, the most salient quality is whether the posture increases or decreases stability, and a countervalue model is arguably superior in this respect.

Steep Reductions in Nuclear Warheads

Rejecting counterforce targeting would yield many additional benefits beyond shielding leaders from their own risky decision making. Not least of these would be a steep drop in the size of the US arsenal, the overwhelming driver of which is the abundance of military targets in Russia. Eliminating the requirement to destroy these assets would limit the number of enemy aim points to a fixed set of infrastructure targets, which would substantially reduce warhead needs. As part of this doctrinal shift, the United States could also phase out its silo-based ICBMs, an idea that is rapidly gaining in respectability. Indeed, a panel led by Gen James Cartwright, former commander of US Strategic Command, recommended in 2012 that these weapons be retired.[68]

Eliminating the land-based leg of the triad would occasion great handwringing, but it would hardly constitute the most radical policy of the nuclear age. Certainly more psychologically discomfiting was the Anti-Ballistic Missile Treaty, which hinged on the counterintuitive notion that the United States and the Soviet Union could improve their security by preserving their defenselessness to nuclear attack. And of course a diverse group of nuclear practitioners, including many senior military leaders, has embraced nuclear abolition. Relative to these

ideas, it seems distinctly uncontroversial to suggest retiring weapons that pose enormous risks to strategic stability and are of questionable military utility.

Beyond debates about the value of any particular weapon system, a more fundamental objection to steep warhead cuts is the conviction that nuclear superiority translates directly into coercive leverage. Matthew Kroenig, for example, argues that states that possess numerical superiority in weapons have correspondingly higher levels of effective resolve, which in turn causes them to "push harder in a nuclear crisis, improving their prospects of victory."[69] Yet, this phenomenon may argue *against* nuclear imbalances for the reason identified earlier. In crises where states fundamentally misperceive each other's tolerance for risk, the result of overconfidence may not be dominance but rather catastrophe.

De-emphasis of Nuclear Weapons in US Security Policy

Finally, adopting a countervalue strategy would enable a range of policies that circumscribe the role of nuclear weapons in US security policy, a goal that President Obama articulated in Prague.[70] First, the United States could comfortably adopt a pledge not to be the first to use nuclear weapons in a conflict. While US doctrine lists a range of potential first-use scenarios—for example, targeting deeply buried biological weapons facilities—these are mere garnishes to the primary mission of US strategic weapons: preemptively destroying enemy nuclear forces. If the limitations of this strategy were appreciated more widely and US doctrine modified accordingly, the chief impediment to adopting a no-first-use pledge would be greatly attenuated. Additionally, deployed warheads could be maintained at lower states of alert, which many senior leaders believe even now to be far out of proportion to the nation's deterrence needs.[71]

Coupled with warhead reductions, changes to US targeting policy could influence foreign decision making by reassuring America's rivals that they do not need formidable nuclear forces to deter the United States. While it is important not to overstate the responsiveness of foreign nuclear programs to American policies, it is not implausible that US doctrinal adjustments could have cascading effects. Consider the interlocking nature of the world's nuclear deterrence relationships, where Russia and the United States must deter each other, China must deter them both as well as India, India must deter China and Pakistan,

and Pakistan must deter India.[72] A fundamental change to the targeting policy of the most powerful of these states could lead to a steep downward revision in the commonly accepted requirements of nuclear deterrence. Even if Russia's targeting policy remained unchanged, countries that have not yet developed robust counterforce capabilities, such as China, India, and Pakistan, might be persuaded not to pursue them in the first place.

Recognizing the difficulty of making such sweeping reforms to the US nuclear posture, as well as the enduring allure of the counterforce option in some scenarios, it may be necessary to consider more modest changes to reduce the danger of catastrophic misperceptions. Ideally, these reforms would address both sides of the underlying problem—the consequences of signaling the United States' low damage tolerance and the intrinsic dangers of the counterforce model itself. Regarding the former, US leaders should consciously avoid rhetoric in other contexts that gives the impression of their extreme sensitivity to nuclear threats. Whether sincere or exaggerated, these statements may invite boldness on the part of adversaries in a crisis, undermining the US bargaining position. Although signaling that the United States is perfectly willing to gamble its cities may lack credibility, at the very least US leaders should refrain from messaging that reinforces the opposite position.

Likewise, if the United States is unwilling to relinquish its counterforce capabilities, initiatives can still be taken to manage the risk of their imprudent use. First, nuclear practitioners should be made to understand that the United States' coercive leverage in nuclear crises may have been compromised by its leaders' rhetoric and policies in other arenas. Injecting this concept into war games and scenario analysis may increase their appreciation of a potent source of adversary resolve. Most importantly, US nuclear war planning should be made less myopic in its focus on deployed, long-range weapons and take into account the potential for delayed retaliation, including with unconventional delivery means. Consideration of these possibilities may not foreclose counterforce targeting altogether, but it may make decision makers more circumspect about the likelihood of a completely disarming first strike.

Conclusion

More than 30 years ago, Thomas Schelling posed the question, what is meant by "having" the bomb? He suggested that in a decade or two,

most countries would "have" nuclear weapons in the sense that Switzerland has an army—a latent military capability that can be quickly constituted in an emergency. Schelling reasoned that it made more sense to characterize many states' nuclear weapon status "not with a yes or a no but with a time schedule."[73] Since then, the idea of "weaponless deterrence" has been at the center of the intellectual case for nuclear disarmament.

Advocates of this controversial model believe that strategic stability can be underwritten by latent nuclear capabilities rather than constituted arsenals and that states with a certain level of nuclear capacity would reap the deterrent value of these weapons without actually possessing them. This condition would arise from the maintenance of a nuclear infrastructure complete with knowledge of nuclear weapon design and access to fissile material. Sweden, for example, maintained a latent nuclear capability for many years by virtue of a deeply buried 65-megawatt reactor capable of producing plutonium and a small cadre of physicists with weapon-design expertise.[74] An adversary weighing aggression against such a state would have to consider its theoretical capacity to retaliate with nuclear weapons, albeit on a much slower schedule.

Many skeptics consider weaponless deterrence to be a fanciful ambition, but the crucial seed of the model may already exist. According to Obama administration official Laura Holgate, some 40 countries already have enough nuclear material to produce a "Hiroshima or a Nagasaki-type explosion."[75] Coupled with evidence that the threat of damage on this scale may be enough to deter even the strongest world power, perhaps weaponless deterrence is less utopian than is commonly supposed. Yet, even if the interval between the status quo and that distant aspiration is ultimately a bridge too far, the insight at the heart of this model may nonetheless call for a wholesale reevaluation of nuclear strategy. If delayed retaliation on a relatively small scale is indeed sufficient to deter, the use or threatened use of counterforce capabilities should be greatly limited whether these systems are dismantled or not.

Ascertaining the United States' maximum damage tolerance, and hence its potential resolve in a crisis, is difficult in the abstract. A useful starting point would be to press US leaders to explain the logical contradictions embedded in US nuclear policy. This exercise may lend credence to the idea that, from the perspective of a state contemplating

nuclear aggression, an opponent's mere possession of fissile material may meet the most fundamental requirement of deterrence. SSQ

Notes

1. McGeorge Bundy, "To Cap the Volcano," *Foreign Affairs* 48, no. 1 (October 1969): 1–20.

2. Rose Gottemoeller, "New START Implementation," testimony before the Senate Foreign Relations Committee, 21 June 2012, http://www.state.gov/t/us/193605.htm.

3. See Barack Obama, "Remarks by the President at the United Nations Security Council Summit on Nuclear Non-Proliferation and Nuclear Disarmament" (press release, Office of the Press Secretary, White House, 24 September 2009), http://usun.state.gov/briefing/statements/2009/september/129562.htm; and Barack Obama, "Remarks by the President at the Opening Plenary Session of the Nuclear Security Summit" (press release, Office of the Press Secretary, White House, 13 April 2010, https://www.whitehouse.gov/the-press-office/remarks-president-opening-plenary-session-nuclear-security-summit.

4. See Keir A. Lieber and Daryl G. Press, "The End of MAD? The Nuclear Dimension of U.S. Primacy," *International Security* 30, no. 4 (Spring 2006): 7–44. For a more recent treatment of the subject by the same authors, see Keir A. Lieber and Daryl G. Press, "The New Era of Nuclear Weapons, Deterrence, and Conflict," *Strategic Studies Quarterly* 7, no. 1 (Spring 2013): 3–12, http://www.au.af.mil/au/ssq/digital/pdf/spring_13/lieber.pdf.

5. I am indebted to Joshua Pollack for this insight.

6. See Paul A. Samuelson, "Consumption Theory in Terms of Revealed Preference," *Economica* 15, no. 60 (November 1948): 243–53. I am indebted to Joshua Pollack for bringing this term to my attention.

7. Despite efforts to prevent pariah states from acquiring nuclear weapons, the United States has permitted one such country to do so without recourse to military action. In 1994, after North Korea (DPRK) threatened to reprocess spent fuel from its Yongbyon reactor, the Clinton administration reportedly drew up military plans to attack the facility. However, this option was shelved upon receiving news of a deal brokered by former president Jimmy Carter, which led to the Agreed Framework to halt North Korea's nuclear weapons program. See Ashton B. Carter and William J. Perry, *Preventive Defense: A New Security Strategy for America* (Washington, DC: The Brookings Institution, 1999), 128–31. That the United States did not respond militarily to the DPRK's subsequent violation of this agreement is at odds with its otherwise aggressive counterproliferation posture. This decision is perhaps best explained by the fact that once North Korea's violation was discovered, it was too late to roll back the DPRK nuclear program without risking nuclear retaliation. Thereafter, North Korea was apparently judged to be containable.

8. Jessica C. Varnum, "60 Years of Atoms for Peace," *Nuclear Engineering International*, 23 January 2014, http://www.neimagazine.com/features/feature60-years-of-atoms-for-peace-4164653/.

9. See Ariana Rowberry, "Sixty Years of 'Atoms for Peace' and Iran's Nuclear Program," *Up Front* (blog), Brookings Institution, 18 December 2013, http://www.brookings.edu/blogs/up-front/posts/2013/12/18-sixty-years-atoms-peace-iran-nuclear-program-rowberry; and Leonard Weiss, "Atoms for Peace," *Bulletin of the Atomic Scientists* 59, no. 6 (November 2003): 34–42.

10. Sam Roe, "An Atomic Threat Made in America," *Chicago Tribune*, 28 January 2007, http://www.chicagotribune.com/news/nationworld/chi-061209atoms-day1-story-htmlstory.html.

11. George W. Bush, "Bush: Don't Wait for Mushroom Cloud," *CNN* transcript, 8 October 2002, http://edition.cnn.com/2002/ALLPOLITICS/10/07/bush.transcript/.

12. Bruce G. Blair and Chen Yali, "The Fallacy of Nuclear Primacy," *China Security* 2, no. 4 (Autumn 2006): 51–77.

13. Richard N. Perle, "The Arms Race Myth, Again," *Washington Post*, 3 March 2008, http://www.washingtonpost.com/wp-dyn/content/article/2008/03/02/AR2008030201854.html.

14. James M. Lindsay, Michael E. O'Hanlon, Charles L. Glaser, and Steve Fetter, "Correspondence: Limited National and Allied Missile Defense," *International Security* 26, no. 4 (Spring 2002): 190–201.

15. Matthew Bunn, Anthony Wier, and John P. Holdren, *Controlling Nuclear Warheads and Materials: A Report Card and Action Plan* (Washington, DC: Nuclear Threat Initiative, March 2003), 15–19.

16. Barack Obama, "Remarks by President Obama and President Zuma of South Africa before Bilateral Meeting" (press release, Office of the Press Secretary, White House, 11 April 2010), https://www.whitehouse.gov/the-press-office/remarks-president-obama-and-president-zuma-south-africa-bilateral-meeting.

17. See US Department of Defense (DOD), *Nuclear Posture Review Report* (Washington, DC: DOD, April 2010), iii; and Barack Obama, "Remarks by President Barack Obama in Prague as Delivered" (press release, Office of the Press Secretary, White House, 5 April 2009), https://www.whitehouse.gov/the-press-office/remarks-president-barack-obama-prague-delivered.

18. Herman Kahn, *On Thermonuclear War* (Princeton, NJ: Princeton University Press, 1960), 32.

19. Kenneth Waltz, "The Spread of Nuclear Weapons: More May Be Better," *Adelphi Papers* 21, no. 171 (1981): 15–16.

20. Devin T. Hagerty, "Nuclear Deterrence in South Asia: The 1990 Indo-Pakistani Crisis," *International Security* 20, no. 3 (Winter 1995–1996): 79–114.

21. Keir A. Lieber and Daryl G. Press, "The Rise of U.S. Nuclear Primacy," *Foreign Affairs* 85, no. 2 (March–April 2006): 42–54.

22. Keir A. Lieber and Daryl G. Press, "The Nukes We Need: Preserving the American Deterrent," *Foreign Affairs* 88, no. 6 (November–December 2009): 39–51.

23. Keith Payne, "A Matter of Record," *Foreign Affairs* 85, no. 5 (September–October 2006): 150–52.

24. Since the Persian Gulf War, when the hunt for Saddam Hussein's mobile SCUD missiles proved so daunting, significant advances have been made in three capabilities that could support the tracking and targeting of mobile missiles: stealthy long-loiter unmanned aerial vehicles, signals intelligence enabling geolocation, and networked ground sensors. See Austin Long and Brendan Rittenhouse Green, "Stalking the Secure Second Strike: Intelligence, Counterforce, and Nuclear Strategy," *Journal of Strategic Studies* 38, no. 1–2 (2015): 38–73.

25. Glenn C. Buchan, David M. Matonick, Calvin Shipbaugh, and Richard Mesic, *Future Roles of U.S. Nuclear Forces: Implications for U.S. Strategy* (Santa Monica, CA: RAND Corporation, 2003), http://www.rand.org/pubs/monograph_reports/MR1231.html.

26. Christopher F. Chyba and J. D. Crouch, "Understanding the U.S. Nuclear Weapons Policy Debate," *Washington Quarterly* 32, no. 3 (July 2009): 21–36.

27. Li Bin and Nie Hongyi, "An Investigation of China–U.S. Strategic Stability," translated by Gregory Kulacki, *World Economics and Politics* 2 (2008), 13–19.

28. Chyba and Crouch acknowledge that a state might "retain the capability, over a longer time period, to retaliate with nuclear warheads delivered without the use of strategic delivery systems (e.g., via smuggling by ship or other method)." However, their depiction of an attack that eliminates strategic nuclear forces as a "confident and disarming" one illustrates their disregard for these alternative means.

29. See Albert J. Wohlstetter, *The Delicate Balance of Terror* (Santa Monica, CA: RAND Corporation, 6 November 1958).

30. Fred Kaplan, *The Wizards of Armageddon* (Stanford, CA: Stanford University Press, 1983).

31. Rajesh M. Basrur, *Minimum Deterrence and India's Nuclear Security* (Singapore: National University of Singapore Press, 2009), 1, 25.

32. See Michael J. Mazarr, "Virtual Nuclear Arsenals," *Survival* 37, no. 3 (Autumn 1995): 7–26.

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Fear and Learning in Tehran

What Recent Psychological Research Reveals about Nuclear Crises

Michael D. Cohen

Abstract

Recent psychological research has shown that experiencing fear, if people believe they have *some* control over the source of the fear, reduces their tolerance for risk. Leaders who experience fear of imminent nuclear war thereafter tend to reject these risky policies. Indeed, experiencing the fear of imminent nuclear war will cause leaders to avoid calculated and uncalculated risks. While the United States should work toward a comprehensive solution with Iran, using force would be not only risky but also counterproductive. If Iran developed the bomb, the use of force would be much less likely to succeed than the simplest policy of all: allowing Iranian political leaders to stop this behavior on their own.

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The Iranian nuclear challenge continues to command attention in the news and within the diplomatic community. Despite the continuing negotiations with the Iranian government at Geneva, fierce debate persists over how to respond to the threat posed by the country's nuclear activities. Most experts believe these activities aim to create either a nuclear weapon or the capability to produce one. Some have pushed for a military attack to damage or destroy Iran's nuclear program, worrying that any permanent settlement would allow Iran to develop a secret breakout nuclear capability and continue to advocate the use of force if Tehran falls short of its Geneva commitments.[1] Others have hoped sanctions and diplomacy alone will keep Tehran a great distance from the bomb and believe a final settlement can permanently prevent the regime from developing it.[2] However, both sides share the underlying assumption

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that if Iran develops nuclear weapons or perhaps even the capability to produce them, the situation would wreak medium- to long-term havoc in the Persian Gulf and wider Middle East as Iran pursues its revisionist agenda behind the cloak of its nuclear deterrent.

However, there is another possibility. James Lindsay and Ray Takeyh recently argued that while a nuclear Iran would be most dangerous "at first, when it would likely be at its most reckless, like other nuclear aspirants before them, the guardians of the theocracy might discover that nuclear bombs are simply not good for diplomatic leverage or strategic aggrandizement."[3] The waxing and waning of the Iranian nuclear crisis over recent decades suggests that the country's supreme leader, Ali Hosseini Khamenei, and his associates are still learning about what nuclear weapons might offer Iran. Indeed, global trends in the conflict propensity of nuclear powers strongly suggest that if Iran developed nuclear weapons, such a learning process described by Lindsay and Takeyh is much more likely than long-term brazen regional behavior.[4] Tehran may try to brandish its newly found nuclear weight around the region, but Khamenei and his associates will quickly learn that nuclear threats do more harm than good. Despite regular warnings that an Iranian bomb would undermine an already fragile Middle East, the fact is since the 1950s, states that have harbored intentions to revise major parts of their status quo—a desire termed revisionist—and have developed secure second-strike nuclear forces have quickly learned that nuclear weapons are not useful for changing their environments. Such states have then accepted their regional order.

One can partly attribute this great nuclear-learning phenomenon to the number and strength of US alliances throughout the world and the presence of adversaries equipped with nuclear weapons. However, nuclear learning mostly results from fear of imminent nuclear war, when leaders of new nuclear weapons states attempt to transform their status quo and cause a nuclear crisis. Recent psychological research has shown that experiencing fear, if people believe they have *some* control over the source of the fear, reduces their tolerance for risk. Beliefs about *no* control or *total* control reduce the effect of fear on risk.[5] Because leaders are likely to believe they have *some* control over whether nuclear war occurs in the context of calculated (i.e., territorial grabs) and uncalculated risks (i.e., inadvertent escalation and/or deliberate nuclear attack), fear of imminent nuclear escalation will tend to make leaders minimize risk and

use nuclear weapons for deterrence rather than dangerous coercive strategies.[6] As leaders of new nuclear powers push to transform their status quo, they are more likely to approach the nuclear brink and experience fear of imminent nuclear war.[7] Attempting to transform the regional status quo after developing nuclear weapons involves accepting the risk of a nuclear crisis and nuclear escalation. Leaders who do this and experience fear of imminent nuclear war thereafter tend to reject these risky policies, because the brain subconsciously associates *any* risky policy to the initiator. Indeed, experiencing the fear of imminent nuclear war will cause leaders to avoid calculated and uncalculated risks: land grabs, other *faits accomplis*, ultimatums and other coercive demands, and limited uses of force. Therefore, while the United States should work toward a comprehensive solution with Iran, using force if the regime is not forthcoming would be not only risky but also counterproductive. It would encourage Khamenei to respond with force if he had a bomb and would further encourage him to build one if he did not. If Iran developed the bomb, the use of force would be much less likely to succeed than the simplest policy of all: allowing Iranian political leaders to stop this behavior on their own.

Nuclear Dogs That Have Not Barked

Former Undersecretary of State for Arms Control and International Security Robert G. Joseph echoed a widely held belief, when he claimed that nuclear weapons would "embolden the leadership in Tehran to advance its aggressive ambitions in and outside of the region, both directly and through the terrorists it supports."[8] In theory, the more nuclear weapons have spread throughout the world, the more the danger of regional instability should have increased.

However, over the past six decades, nuclear proliferation has caused short periods of instability and conflict that have been followed by longer periods of peace and tentative cooperation. Experience with nuclear weapons and the experience of fear in a nuclear crisis moderates the higher conflict propensity of new nuclear powers.[9] The four years that followed the Soviet Union's development of the ability to target the United States with nuclear missiles in 1959 were the most dangerous of the Cold War.[10] Nevertheless, Soviet challenges to major US interests in Berlin and Cuba substantially declined by 1963. China killed several Soviet troops on the disputed Zhenbao Island on the Ussuri River

in 1969, five years after developing nuclear missiles in 1964. However, China did not challenge Soviet positions in the region again and indeed has not used force against the Soviet Union anywhere since then.[11] After Pakistan developed nuclear weapons around 1990, fatalities in the Kashmir conflict increased from 30 in 1988 to nearly 2,000 in 1992 and more than 4,500 by 2001. During this period, Pakistan fought the 1999 Kargil War with India and engaged in a 10-month mobilized crisis in 2001–02.[12] However, fatalities in Kashmir have steadily declined since then, and by 2012 were almost at pre-1990 levels.[13] Indo-Pakistani relations have slowly but steadily improved as Pakistani president Pervez Musharraf and Indian Prime Minister Manmohan Singh authorized secret back-channel diplomacy that may have come close to concluding a final Kashmir settlement.[14]

International security experts have been unable to convincingly explain this remarkable trend. The first and most credible conventional explanation is that changes in the local or international balance of military power prevented territorial revisionism that was earlier permissible. US, Soviet, and Indian defenses were certainly consolidated after Soviet, Chinese, and Pakistani challenges, which made subsequent attempts at revanchism more difficult. However, no defenses could have prevented further challenges. Pres. John F. Kennedy could not have stopped Soviet premier Nikita Khrushchev from attempting to reinstall Soviet missiles in Cuba or issuing further Berlin ultimatums. Soviet premier Leonid Brezhnev could not have prevented further Chinese attacks on Soviet positions on Zhenbao Island. In addition, no Indian defenses could have prevented further Pakistani challenges in the rugged, mountainous peaks of Kashmir. The international balance of nuclear and conventional power hardly changed when Soviet, Chinese, and Pakistani challenges ceased.[15] Increased defenses, useful as they are, cannot account for this phenomenon.

A second conventional explanation is that while changes in the balance of military power may not have been very effective, the simple presence of nuclear weapons has been. Nuclear weapons threaten to wreak total destruction out of even limited conflict; so, nuclear powers should behave with extreme caution.[16] While nuclear powers have hardly behaved with reckless abandon, this caution is not immediate and has to be learned.[17] Before Soviet, Chinese, and Pakistani leaders learned to behave with the caution appropriate for nuclear powers, they pursued

policies that carried a real risk of nuclear war. The simple presence of secure second-strike nuclear forces cannot explain this variation: a constant cannot explain variation.

A third conventional explanation is that the undesirability of nuclear war prevents leaders from forcefully responding to regional aggression by nuclear powers. Moreover, the tendency for military organizations to develop doctrines and policies that diverge from the preferences of civilian leaders carries a real risk of accidental or unintended nuclear escalation. New nuclear powers have indeed tended to be dangerous.[18] However, the same experienced nuclear powers have not. Instead, they have accepted major parts of their status quos that earlier were deemed intolerable. Military doctrines have not yet caused nuclear war and have been most dangerous when civilian leaders have practiced revisionism.

Finally, many have pointed toward elite competition within these regimes as a source of their undesirable behavior. However, Khrushchev and Mao Tse-tung were at the peak of their political power within the Soviet Union and China respectively when these states' foreign policies were so dangerous.[19] It is unlikely Musharraf authorized the Pakistani intrusion into Kargil in 1999 as part of a political power grab, and the general controlled Pakistani policy toward India throughout the 2001–02 crisis. Although the regime in Tehran may be highly fragmented, it is likely that if Iran develops nuclear weapons, Khamenei will have as much control over Iranian foreign policy as Khrushchev, Mao, and Musharraf did over theirs. There is an imperfect correlation between elite politics and foreign policies of these states: whereas the former hardly changed, the latter fundamentally transformed.

Fear and Loathing

A more convincing explanation for the moderating effect of experience with nuclear weapons begins with the familiar observation that nuclear weapons are poor instruments for coercive diplomacy.[20] However, the low coercive value of nuclear weapons says nothing about how leaders learn this. Leaders—especially those motivated to revise their regional order—are no more likely to immediately hit upon accurate answers here than they are to immediately learn about the coercive power of other military strategies or weapons. The historical record presented hereafter clearly shows leaders of revisionist states learn about the coercive limits of nuclear weapons the way most people learn most

things: personal experience.[21] It occurs in their own nuclear crisis rather than through a more systematic analysis of their adversary, region, or the historical record. Moreover, their initial belief that nuclear weapons might allow them to realize their otherwise elusive revisionist dreams causes their nuclear crisis. Fear is the relevant variable that causes these lessons about the limits of nuclear weapons over time. Nuclear crises cause enough fear to produce moderation of revisionist, new nuclear powers that no aggregation of military and economic power can realize. Thus, there is a systematic effect of experience with nuclear weapons on a state's conflict propensity.[22]

Numerous studies have found that the experience of fear causes people to reduce their acceptance of risk. Images that are known to cause fear under laboratory conditions, such as images of snakes or the September 11 attacks, routinely cause people to accept less risk in subsequent choices than those not shown the images. People's brains are hardwired to avoid future situations they perceive as similar to those that caused the initial fear experience. If leaders fear imminent nuclear war, they will avoid any policies they believe will likely bring them back to the brink. Leaders' successors will likely also have experienced fear and likely behave similarly. This effect of fear on risk is not generated by any amount of reading of history and is conditional on people believing they have some control over the source of their fear. Unsurprisingly, fear has little effect on risk when one believes they have little control over its source. Why run from the bear if you think you cannot escape it? When people experience fear and believe they have no control over its source, its effect on risk acceptance is slight. However, when people experience fear and believe they have *some* control over its source—as leaders in nuclear crises would—they become extremely unlikely to accept further risks. This risk aversion occurs in those areas that are perceived to cause similarly dangerous situations as those that originally caused the fear in other unrelated circumstances. While these insights come from the laboratory experiments cited above, it is also clear that the effects of fear are substantially greater when the subjects are world leaders rather than undergraduate students and when these leaders genuinely believe they have control over whether nuclear war erupts.

Although it is difficult to measure the experience of fear precisely, the historical record shows that when leaders develop nuclear weapons and stumble into a nuclear crisis, the fear of imminent nuclear war is neces-

sary for them to radically transform their foreign policies. If they attempt to transform their regional order through some combination of nuclear threats and salami tactics and do not experience fear of imminent nuclear war, they will likely continue with their aggression. A healthy respect for the danger associated with nuclear weapons is insufficient to cause them to reverse course. Knowledge about how nuclear powers might cause nuclear war will not suffice. Leaders must stare down the nuclear brink and expect imminent nuclear destruction within hours or days.

People take time to learn. It took Khrushchev almost four years from the development of nuclear missiles in 1959 to the Cuban missile crisis in 1962. Five years passed Mao's first 1964 nuclear test before the 1969 war scare. Pakistan developed nuclear weapons in 1990, and Musharraf did not experience fear of imminent nuclear war until May 2002. Of course, new nuclear powers are not all the same. The Soviet Union, China, and Pakistan differ in many obvious ways. Cold War Europe, East Asia in the 1960s, and South Asia in the 1990s exhibited important differences. Soviet, Chinese, and Pakistani leaders had different grievances and addressed them through different strategies. However, these differences conceal a striking similarity. Fear of imminent nuclear war had similar effects on Soviet, Chinese, and Pakistani aggression. Such fear made deterring revisionism by these powers much easier, because they were less inclined to accept the risk. While before experiencing fear they pursued dangerous policies that dragged them into nuclear crises, afterward they substantially moderated their aggression and largely resolved contested but otherwise unresolved issues. Despite stark differences in culture, ethnicity, history of previous conflict, and leadership personality, the experience of fear of imminent nuclear war was necessary to cause leaders to refrain from nuclear coercion.

Fight or Flight?

The Soviet, Chinese, and Pakistani cases all involved leaders who believed they had some control over nuclear escalation when they experienced fear. It is clear Khrushchev, Mao, and Musharraf had supreme control over their respective countries and would have believed they had real leverage—but obviously not total control—over whether nuclear war occurred. The Soviet, Chinese, and Pakistani crisis years—in the early 1960s, late 1960s, and early 2000s respectively—might seem to contradict the idea that fear causes revisionist states to back down. After

all, these episodes constituted the most dangerous peak of crisis periods that almost plunged the world or specific regions into nuclear war. However, these cases are clear instances of fear of imminent nuclear war moderating reckless foreign policies. Indeed, it is likely that had these leaders not experienced fear of imminent nuclear war they would have continued in their revisionist ways.

Although the Soviet Union first tested a nuclear bomb in 1949, Khrushchev did not obtain the capability to reliably target the United States with nuclear missiles until a decade later.[23] One-way Soviet bombing runs were too vulnerable to North Atlantic Treaty Organization (NATO) air defenses, and Khrushchev's 1956 Suez crisis threat was all bluff.[24] Nevertheless, the Soviet leader believed nuclear threats would enable him to get his way in the Middle East, West Berlin, Cuba, and elsewhere. According to Khrushchev's son, Sergei, the Soviet leader learned that "the mere mention of nuclear-armed missiles had a powerful effect."[25] Indeed, these years were the most dangerous of the Cold War. In addition, throughout the two Berlin crises, Khrushchev did not experience fear of imminent nuclear war.[26] However, after President Kennedy announced the quarantine of Cuba on 22 October 1962, Khrushchev began to experience fear of imminent nuclear war. He claimed to his presidium colleagues, "We started out and then got afraid. . . . [Moreover,] the tragic aspect is that they might attack and we will repulse it. It might turn into a big war."[27] He likely worried that US forces would prevent the remaining Soviet ships and submarines that advanced toward Havana from proceeding and that Soviet retaliation would quickly escalate to nuclear war.[28] Khrushchev stated to the president of Czechoslovakia on 30 October 1962, "We were truly on the verge of war."[29] He proclaimed in early December 1962, "Of course I was scared. It would have been insane not to have been scared. I was frightened about what could happen to my country—or your country or all the other countries that would be devastated by a nuclear war. If being frightened meant that I helped avert such insanity then I'm glad I was frightened."[30]

Khrushchev learned of the danger of nuclear coercion not from history or abstract theory but from his own personal experience at the nuclear brink. After this experience, he not only refrained from attempting to reinstall Soviet nuclear missiles in Cuba but also accepted the intolerable situation in West Berlin, offered concessions in stalled nuclear test

ban negotiations, and accepted milder communist revolutions in Iraq and Laos. Where earlier he lashed out, after experiencing fear, he more passively accepted intolerable changes. Tacit cooperation and confidence building measures replaced coercive demands.

By February 1969, Soviet forward patrolling of the disputed Zhenbao Island had become more aggressive, and fighting had seriously wounded several Chinese troops.[31] After a Chinese retaliatory ambush in March caused 200 Soviet fatalities, Chairman Mao began to worry about a retaliatory Soviet nuclear strike and experienced fear of imminent nuclear war.[32] Extensive underground tunnels were built throughout the country, Chinese leaders were evacuated from Beijing, and military units were placed on high alert. Mao confided to his personal nurse that "China and the Soviet Union are now at war."[33] It is possible that Andrei Grechko, the Soviet defense minister who planned the 1968 invasion of Czechoslovakia under the pretext of Warsaw Pact training exercises, had threatened to punish China with a nuclear assault.[34] Mao's doctor recalled the August 1969 relocation of millions from the city to the country: "Remaining city residents were mobilized to 'dig tunnels deep' in preparation for aerial, possibly nuclear, attack."[35] That month, Mao concluded that "it is not good for all central officials to assemble in Beijing . . . [because] even one atomic bomb will kill many of us."[36] The evacuation of China's top leaders from the capital shortly followed. He worried the incoming flight carrying Soviet premier Alexei Kosygin, arriving ostensibly to restart negotiations, might turn out to be an ambush and placed specially trained battalions throughout the airport. On 18 October, when the Kosygin flight was expected to arrive, Chinese strategic missile forces were placed on their highest alert for immediate launch. People's Liberation Army units were ordered to a state of total readiness. At a meeting of generals from all regional commands and service arms to address readiness, the term most often heard in the meeting hall was "the coming Soviet surprise attack."[37] On 19 October, Mao's deputy, Lin Biao, remained fixated on the Soviet aircraft that was carrying the Soviet delegation to Beijing, demanding intelligence updates every few minutes and delaying his usual afternoon nap until the Soviet delegates had departed Beijing.[38] After the Kosygin talks safely concluded, Chinese forces were kept at full alert for another six months. Moscow and Beijing subsequently agreed to conflict prevention and escalation reducing measures, and China has not used force against Soviet

or Russian positions on Zhenbao or elsewhere since 1969.[39] Mao seems to have learned of the dangers of nuclear weapons not from history but from his own nuclear crisis with the Soviet Union.

After developing nuclear weapons in 1990, Pakistan had not fought a war with India for almost two decades. However, Islamabad substantially increased sponsorship of the Kashmir insurgency throughout the 1990s, started the Kargil War in 1999, and engaged in a ten-month mobilized crisis with India between 2001 and 2002. After Pakistani-supported insurgents killed 30 civilians at a military camp in Jammu in late May 2002, Indian prime minister Atal Vajpayee threatened Pakistan with an invasion to dismantle terrorist infrastructure. Pakistani president Musharraf responded in late May with three missile tests and threats of nuclear attack against an Indian invasion.[40] By the end of the month, Musharraf "hardly slept . . . [and] feared imminent nuclear war."[41] During his 27 May presidential address to his nation, Musharraf claimed, "Pakistan is currently passing through a critical juncture. We are faced with a grave situation and we are standing at the cross road of history. Today's decision will have serious internal and external effects on our future. . . . Tension is at its height."[42]

On 1 June, in his first public speech after experiencing fear of imminent nuclear war, Musharraf proclaimed that leadership on both sides must realize the very dangerous nature of the situation and that there should be no miscalculation on either side.[43] He subsequently described the May crisis as "very close . . . [and] extremely tense because there were war clouds."[44] In June 2003, he told the *Washington Post* that "two hundred percent, there won't be war . . . [because of] the understanding of the leaders. We've fought three wars and we know the hazards of war."[45] Musharraf made no such claims after the 1999 Kargil War and the December 2001 terrorist attacks on the Indian parliament. Indian and Pakistani English-language newspaper coverage of the South Asian crisis also suggests that Musharraf experienced fear of imminent nuclear war at the end of May 2002.[46] Pakistani newspaper coverage of the crisis during the last week of May was about eight-times greater than coverage in December 2001 when the Indian parliament was attacked. Coverage during the last week of May 2002 was between two-thirds and four-fifths of Pakistani coverage of the Kargil War between mid-June and mid-July 1999, when the Indian army began to attack Pakistani positions, killed hundreds of Pakistani troops, and recaptured occupied

territory.[47] That Pakistani coverage in May 2002 was almost as high as when hundreds of Pakistani troops were being killed in Kashmir at the height of the Kargil War suggests that the May crisis also captured much national attention. Musharraf learned of the dangers of nuclear coercion not from the Cold War or even the history of Indo-Pakistani relations but from his own experience at the nuclear brink.

While violence in the Kashmir insurgency after May 2002 did not disappear, it declined substantially.[48] However, 2012 was almost as dangerous as 1999. Many have argued that this Pakistani about-face was caused in fact by US pressure on Islamabad to rein in its support for Kashmiri insurgents in the aftermath of the September 11 attacks and the US war in Afghanistan.[49] US pressure on Musharraf indeed occurred during the same period he experienced fear, making it difficult to isolate the role each played in Musharraf's decision-making process. However, the problem with the US coercion argument is that Pakistan did not succumb to US pressure to rein in its support. After Pres. George W. Bush's heavy-handed threats, Musharraf paid lip service to appease Washington and Delhi but offered no meaningful concessions. Pakistani authorities handed no militants over to India, and many of the militants the Pakistanis did apprehend were later released. Moreover, the US coercion argument cannot explain why Pakistan pursued a policy of nuclear threats to realize its Kashmir goals before May 2002 but opted for secret diplomacy, confidence-building measures, and tacit cooperation thereafter. Pakistani policy in Kashmir during the decade since 2002 has simply been much more risk averse than in the decade before. Musharraf's experience of fear of imminent nuclear war in late May 2002 explains the dramatic turnaround.

Terrified in Tehran?

One might argue these findings are not applicable to Iran, due to that country's unique culture and religion and its distinct geopolitical and economic motives to develop nuclear weapons. However, the fact is that almost all states that have developed nuclear weapons have stumbled into a crisis out of inexperience and then authorized more moderate nuclear strategies and foreign policies after a few years' experience. This "experience effect" in the cases of the United States (in Korea), the Soviet Union (in Hungary), the United Kingdom (in Egypt) and France (in Algeria), cases in the late 1940s and early 1950s, are likely attribut-

able to the early Cold War as well as nuclear weapons. It is not clear that fear played a role here, because the uncertainty associated with the early Cold War drove the conflict propensity of the new nuclear powers. However, all inexperienced nuclear powers since the late 1950s have found themselves in conflicts and wars either trying to revise a status quo (Soviet Union and Pakistan) or preventing and/or coercing a revisionist nuclear power from doing so (India). In China's case, nuclear weapons seem to have emboldened the Chinese to respond more forcefully to aggressive Soviet patrolling of disputed territory. In some cases whether the new nuclear power is revising or defending the status quo is unclear, because many other factors are also changing in a particular region, for example Israel and South Africa. Nevertheless, the fact that countries as different as the Soviet Union in the early 1960s, China in the late 1960s, and Pakistan in the early 2000s exhibited strikingly similar variation in their fundamental choices of coercive or moderate nuclear strategies shows that the great nuclear learning phenomenon knows no cultural or geographic bounds even though these countries exhibit important differences. The effect of experience with nuclear weapons on the central elements of their nuclear strategies over time is striking.

We can predict the general contours of how an inexperienced nuclear Iran would behave based on a careful reading of similar trends in these earlier cases. Many have argued Iranian culture and religion suggest the regime would behave far more dangerously than earlier inexperienced nuclear powers. However, while most Iranians believe a uranium enrichment program is their natural right, public opinion regarding developing nuclear weapons is much more divided. Ayatollah Ruhollah Khomenei explicitly stated that Iran should not develop nuclear weapons. While some conservative leaders have spoken of the virtues of sacrifice for the nation, it is far from certain this would cause them to use nuclear weapons or authorize aggressive foreign policies that put the regime and country at risk. Iranian culture and religion are obviously different from those of other nuclear powers, but there are no reasons to expect the regime to be an exception to the historical rule. One might worry Iran would give nuclear weapons to terrorists, but it would have strong incentives not to forfeit control over such powerful weapons.[50]

Others might also argue that Iran's motivation for developing nuclear weapons differentiates it from other cases. Scholars have extensively debated the causes of nuclear weapons proliferation.[51] However, the fact

remains, whether those states that have developed nuclear weapons did so because of defensive or offensive geopolitical ambitions, domestic politics, well-endowed science bureaucracies, global isolation, psychological biases, or nationalistic beliefs, leaders in all countries behaved in fundamentally similar ways over time when they were inexperienced with nuclear weapons. The relationship between a state's decision to develop nuclear weapons and what happens after development is tenuous. A partial exception to this rule is the extent to which Khamenei and his associates in the Revolutionary Guard are dissatisfied with the status quo in the Persian Gulf. They likely desire to end their state's regional and global economic and political isolation and to increase their influence over regional affairs and economic development.[52] They may wish to reduce US influence by increasing the cost of US presence in the region. The stronger these desires—either before or after developing nuclear weapons—the greater the likelihood of Iran harassing Persian Gulf tanker traffic, sponsoring Shiite groups around the region to undermine conservative Sunni states, and sponsoring attacks against US troops throughout the Persian Gulf. Iran might issue coercive threats to the United States or its regional allies. While the Iranian army is large, many of its forces are obsolete and are no match for Israeli or US forces in a conventional conflict. Nor would Iran be able to do much to threaten or destroy Saudi oil production.[53] However, if Iran develops nuclear weapons, fear of imminent nuclear war in a crisis is likely to cause Khamenei and his associates to rely on moderate nuclear strategies. Moreover, if an inexperienced nuclear Iran begins to demonstrate hubris in the region, a crisis, fear of imminent nuclear war, and more moderate nuclear strategies will follow irrespective of whether Iranian threats were directed at the United States or its regional allies. Direct threats against the US homeland may cause a crisis more quickly than threats against Israel, Saudi Arabia, or other US regional allies, but the likelihood of a nuclear crisis and the concomitant effects of fear of imminent nuclear war would be the same in both cases.

One can also argue that an Iranian bomb could unravel the nuclear nonproliferation regime. The causes of a Saudi or Turkish bomb and the impact of this on the nuclear nonproliferation regime are separate questions that I cannot fully address here. However, the literature on the causes of nuclear proliferation suggests that whether an Iranian bomb would cause regional proliferation is far from clear. Policy makers have

worried about this ever since Pres. Kennedy worried about 40 nuclear powers in the 1960s, but well into the twenty-first century, the number of nuclear powers remains below 10.[54] For example, while Saudi policy makers have often said they would develop nuclear weapons if Iran did so, much of this is designed to pressure the United States to prevent Iran from developing the bomb.[55] The United States has effectively used a combination of carrots and sticks to prevent many states from developing nuclear weapons, and it is not clear that an Iranian bomb would stop this trend.[56] Finally, one can argue that an Iranian bomb would undermine the global nuclear nonproliferation regime. Again, I cannot fully address that issue here, but the effect of the nuclear nonproliferation regime on states' decisions to develop nuclear weapons is contested.[57] Moreover, it is a stretch to assume that an Iranian bomb would have much effect on distant states' nuclear decisions. An Iranian bomb may well pose challenges to the global nuclear nonproliferation regime that are as similar and surmountable as those posed by the other nuclear powers.

In the long crisis over Iran's nuclear activity, the great nuclear learning phenomenon has all but gone unmentioned. The robust historical trend clearly indicates a need to guard against hasty conclusions that an Iranian bomb would wreak havoc throughout the Persian Gulf and Middle East. If Khamenei evades Israeli bombs and computer hackers, secretly develops nuclear weapons, and attempts to increase the cost of US influence in the region, there is little the United States and its allies could do to stop him short of military attack. Harassing Persian Gulf tanker traffic, undermining conservative Sunni regimes, and sponsoring attacks against US troops in Iraq and Afghanistan are not easily deterred. Thus, a growing number of policy makers and analysts have argued that military force should always be an option—one that may well be required if Iran developed nuclear weapons.[58] Nevertheless, an attack would likely cause Iran to double down on its nuclear program and may cause a regional war.

The custodians of any potential Iranian nuclear arsenal face a great obstacle to realizing their revisionist ambitions. Any attempts to reduce US influence in the region would likely cause US and/or Israeli reactions that would eventually leave Khamenei and his associates fearing imminent nuclear war. Such fear caused Soviet, Chinese, and Pakistani leaders to cease their nuclear saber rattling, and it is unlikely Iranian leaders

would react differently. If Iranian leaders believed a nuclear war was imminent, they would do whatever they could do ensure nuclear weapons would not be used. The historical record suggests that under these conditions Iranian foreign policy would come to resemble that of other experienced nuclear powers. It is also likely that Iranian foreign policy toward its other adversaries would show more signs of cooperation and confidence building and less signs of bluff and bluster. It is surely more difficult to establish whether Iranian leaders have experienced fear of imminent nuclear war than it is to count the number of challenges a nuclear Iran could pose to the United States and its partners. However, such an assessment is vital, because whether and how Khamenei and his associates experience fear of imminent nuclear war will determine if Iran throws its nuclear weight around the region and decide the manner in which the regime stops doing so. In the meantime, two broad lessons from the great nuclear learning phenomenon provide a more sober assessment of the situation.

If Tehran develops nuclear weapons, the first lesson is, the United States should not attack Iran. Imposing a nuclear crisis on new nuclear powers hoping to quickly cause the desired effects of fear through US threats or uses of force would be a dangerous mistake, because the desired effect of fear depends on beliefs about control. If Khamenei believes regime change is imminent, he will likely believe he has little control over nuclear escalation and the fate of his regime. He would be most likely to use nuclear weapons under these conditions. If Tehran developed nuclear weapons and attempted to revise the status quo through a combination of threats and smaller uses of force, the United States would not have to do much to cause Khamenei to learn of the limits of nuclear weapons to transform the Persian Gulf. Superior US military power can easily prevent Tehran from sustaining revisions to the status quo. Policy makers should reconsider any intelligence assessments that do not explicitly account for the impact of fear of imminent nuclear war on Tehran's behavior. Assessment after assessment has suggested that nuclear weapons would embolden Tehran to harass Persian Gulf tanker traffic, threaten or attack Saudi oil infrastructure, and increase sponsorship of attacks against US troops in Iraq and Afghanistan. Khamenei and his associates may try to do this, but the historical record shows that the workings of the human mind will prevent them from getting very far.

The second lesson is that the United States should not threaten to attack Iran and would do well to announce it would only use force if Tehran first attacked US forces or perhaps those of key allies. US military power is so much greater than that of Iranian forces that if the US deployed forces in the region during a nuclear crisis, the mistrust and suspicion between Washington and Tehran may cause Khamenei to believe regime change was imminent. He would seriously consider using nuclear weapons under these conditions.

The best US deterrence policy would credibly commit to leave Tehran with some control over whether conventional or nuclear war erupts. US military assets deployed to the region should be much better at defending US and allied troops from Iranian challenges than invading and occupying Tehran. Khamenei would be much more likely to believe he had control over nuclear escalation and the fate of his regime during a nuclear crisis if he believed the United States would not attack unless deliberately provoked.

Traditionally, dealing with new nuclear powers has involved some combination of robust extended deterrence policies and threats to use force. However, revisionist new nuclear powers of the twenty-first century are likely to have very weak conventional military power. The dynamics of how people react to fear ensure that US threats to topple the regimes of these nuclear powers pose substantial dangers. The world is fortunate that leaders of new nuclear powers have been educated by fear and restrained their own revisionist ambitions. The United States and its allies must take care not to adopt policies thought to decrease the risk of nuclear war that actually make it more likely. If Iran develops the bomb, the best US approach would allow Iran to experience nuclear fear and learn to curtail their revisionist plans. SSQ

Notes

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5. The literature attesting to this effect is extensive. *See* Jennifer Lerner and Dacher Keltner, "Fear, Anger and Risk," *Journal of Personality and Social Psychology* 81, no. 1 (2001): 146–59, http://socrates.berkeley.edu/~keltner/publications/lerner.fear.jpsp.2001.pdf; Jennifer Lerner, Roxana M. Gonzalez, Deborah A. Small, and Baruch Fischhoff, "Effects of Fear and Anger on Perceived Risks of Terrorism: A National Field Experiment," *Psychological Science* 14, no. 2 (March 2003): 144–50; and Linda J. Skitka, Christopher W. Bauman, Nicholas P. Aramovich, and G. Scott Morgan, "Confrontational and Preventative Policy Responses to Terrorism: Anger Wants a Fight and Fear Wants 'Them' to Go Away," *Basic and Applied Social Psychology* 28, no. 4 (2006): 375–84.

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7. One might argue that we cannot know if leaders believed that they were at the nuclear brink. But if later scholars can identify the mobilizations and diplomacy that documented that nuclear war was imminent, leaders who authorized the mobilizations and diplomacy surely also believed that they were at or near the brink.

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9. Horowitz, "Spread of Nuclear Weapons." 242–52.

10. For the argument that the Soviet Union developed nuclear missiles much later than usually assumed, *see* Matthias Uhl and Vladimir I. Ivkin, "'Operation Atom': The Soviet Union's Stationing of Nuclear Missiles in the German Democratic Republic, 1959," *Cold War International History Project Bulletin* 12/13 (Fall–Winter 2001): 299–307, http://www.wilsoncenter.org/sites/default/files/CWIHP_Bulletin_12-13.pdf.

11. M. Taylor Fravel, *Strong Borders, Secure Nation: Cooperation and Conflict in China's Territorial Disputes* (Princeton, NJ: Princeton University Press, 2008), 216. For evidence of Mao's 1969–1970 war scare, *see* John Wilson Lewis and Xue Litai, *Imagined Enemies: China Prepares for Uncertain War* (Stanford, CA: Stanford University Press, 2006), 48–72.

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23. Uhl and Ivkin, "Operation Atom," 299–305.

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26. *See* Nikita Khrushchev, *Memoirs of Nikita Khrushchev*, vol. 3: *Statesman, 1953–1964,* ed. Sergei Khrushchev, trans. George Shriver (University Park: Pennsylvania State University Press, 2004); Sergei Khrushchev, *Nikita Khrushchev and the Creation;* Sergei Khrushchev, *Khrushchev on Khrushchev: An Inside Account of the Man and His Era* (New York: Little, Brown, and Company, 1990); and William Taubman, *Khrushchev* (New York: Norton, 2003).

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