

EE190: Nuclear Weapons, Risk and Hope

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Is there hope of reducing the risk?

If my [preliminary analysis](#) is correct and the risk posed by nuclear weapons is at least a thousand times greater than living near a nuclear power reactor, that leads to another critical question: Is there any hope of reducing the risk to an acceptable level? Are human beings capable of such radical change?

If you have the time to do the following exercise, I'll be very interested in hearing what you find out: Ask other students if they think nuclear weapons pose an acceptable or unacceptable risk. If unacceptable, do they think anything can be done to remedy that situation? What barriers do they see to change? What changes do they think might be possible? What barriers do they see to people (themselves including) getting involved? At our January 26th class meetings, I'll allow some time to hear what you found.

Was there hope of abolishing slavery?

Not so long ago, most people thought ending slavery was beyond human capability. The following are excerpts from [arguments](#) along those lines made in 1856 by Charles Jared Ingersoll, a prominent Philadelphia civic figure, Congressional representative, and author.

Without inquiring whether it [slavery] be evil, as most insist, or good, as some contend, unquestionably it is a vast, stupendous, and vital American reality. ... there should and must be considerate and patriotic Americans ... willing to accept historical, political, and philosophical ascertainment that, whether slavery be evil or not, modern external abolition is a much greater evil. Vouched by irrefutable English and American authority, negro slavery in America may be so vindicated that no American need shrink from its communion. Its abrupt, forcible, or extrinsic removal would be a tremendous catastrophe. Dismembering the United States and destroying the American republic would tend not to abolish, but perpetuate slavery. ... every lover of his country should desire to vindicate its institutions, of which this is one, from foreign detraction ... by overruling Providence men have been slaves of masters in all ages and in every country. ... slavery and its products advance continental prosperity, maintain the grandeur of confederated United States, cheaply vouchsafe almost permanent peace, and develop a benign experiment of tranquil republican government.

If you change the issue being debated from slavery to nuclear deterrence (and modernize the language), how close does it come to some current-day arguments in favor of maintaining our current nuclear posture? Below, I've repeated some of the above arguments concerning slavery along with similar arguments made in recent years concerning nuclear weapons. Where possible, the latter are quotes from others. In others,

I have had to compose them myself. Comments and criticism are welcome, and if any of you can find newsworthy quotes to substitute for my composed ones, please let me know. That would enhance the presentation.

Without inquiring whether it [slavery] be evil, as most insist, or good, as some contend, unquestionably it is a vast, stupendous, and vital American reality.

Whether nuclear weapons are evil, as some insist, or keepers of the peace, as others contend, they are vital to America's security.

There should and must be considerate and patriotic Americans ... willing to accept historical, political, and philosophical ascertainment that, whether slavery be evil or not, modern external abolition is a much greater evil. Vouched by irrefutable English and American authority, negro slavery in America may be so vindicated that no American need shrink from its communion.

The large number of our allies who seek shelter under our nuclear umbrella proves that we have nothing to apologize for. On the contrary, the free world owes us a debt of gratitude for shouldering the burden of protecting it from hostile forces.

[Slavery's] abrupt, forcible, or extrinsic removal would be a tremendous catastrophe. Dismembering the United States and destroying the American republic would tend not to abolish, but perpetuate slavery.

the goal, even the aspirational goal, of eliminating all nuclear weapons is counterproductive. ... it risks compromising the value that nuclear weapons continue to contribute, through deterrence, to U.S. security and international stability.

The above is a quote from a November 2007 [OpEd](#) entitled "The Nuclear Disarmament Fantasy," by Harold Brown and John Deutch that criticized the [first OpEd](#) by Shultz, Perry Kissinger, Nunn as unrealistic, wishful thinking. Brown was Carter's Secretary of Defense, and Deutch was Clinton's Director of Central Intelligence, so both served in Democratic administrations.

A world without nukes would be even more dangerous than a world with them.

The above is a quote from a July 2009 [newspaper interview](#) with James Schlesinger, who served as Secretary of Defense under Nixon and Ford, Secretary of Energy under Carter, and Director of Central Intelligence under Nixon.

The total elimination of nuclear weapons would make war more likely.

every lover of his country should desire to vindicate its institutions, of which this is one, from foreign detraction

It is easy for nations that do not shoulder the burden of protecting the free world to criticize our nuclear arsenal, but patriotic Americans will recognize it as the bulwark that

protects those detractors as well as us from the forces of evil which, unfortunately, still exist in this imperfect world.

men have been slaves of masters in all ages and in every country

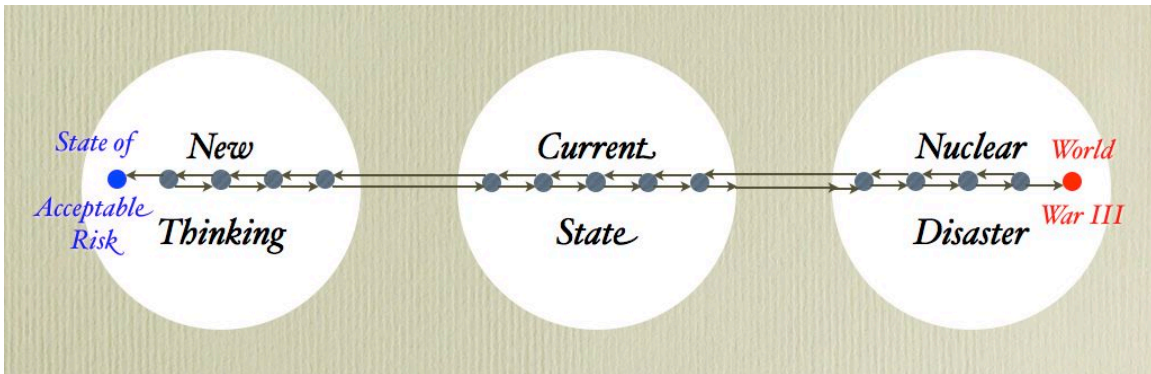
War has been an intrinsic part of human civilization in all corners of the world and throughout history. As uncivilized as nuclear deterrence may seem to some, it is far preferable to the periodic wars which afflicted Europe and the United States prior to the nuclear age and which are now a relic of the past.

slavery and its products advance continental prosperity, maintain the grandeur of confederated United States, cheaply vouchsafe almost permanent peace, and develop a benign experiment of tranquil republican government.

Nuclear weapons have kept the peace for 65 years, and at a cost that is a small fraction of either a third world war or conventional armaments that might hope to achieve the same goal. Foolishly abolishing them would expose us to risks far greater than any that the weapons themselves pose.

Envisioning the Inconceivable

Risk analysis helps us envision how the inconceivable horror of a nuclear war could occur through a sequence of mistakes which compound to produce a nuclear disaster. In handout #1, this was depicted by adding a number of substates within two super-states. My article [Soaring, Cryptography and Nuclear Weapons](#) gave examples of substates that led to the 1962 Cuban crisis and modern-day analogs that came close to repeating those mistakes.



To help envision the positive possibility, the above diagram adds a third super-state, labeled *New Thinking*. Just as transitions are possible back and forth across the nuclear threshold separating the middle super-state and *Nuclear Disaster*, transitions are possible in both directions between the middle super-state and the new super-state, labeled *New Thinking*. Only the final substates, *World War III* and a *State of Acceptable Risk* are

absorbing states. (Given the substate terminology, I realize that this state of acceptable risk should be called a substate of acceptable risk, but I prefer the simpler name.)

While there are arguments about how destructive a full-scale nuclear war would be, prudence dictates assuming that *World War III* would be a state of no return. Similarly, a *State of Acceptable Risk* must be absorbing. Its long-term risk level would not be acceptable if it were possible to transition back to earlier states of unacceptable risk. In this new figure, our current substate is near the center of the middle super-state. We are not in imminent danger of World War III, but neither are we close to a state of acceptable risk.

The positive super-state is denoted *New Thinking*, based partly on Albert Einstein's famous statement: "The unleashed power of the atom has changed everything save our modes of thinking and we thus drift toward unparalleled catastrophe." There's another reason for calling that super-state *New Thinking*.

In mathematics, if a line of reasoning leads to an absurd conclusion, it is called a *reductio ad absurdum* (a reduction to the absurd) and proves that there must be an error in the logic. Some of these errors can be very subtle and hard to find, but whenever you reach an absurd conclusion, it's a sure sign of one. There is significant evidence that faulty logic has been at work in developing our national security strategy: Prior to the nuclear era, we were inviolate. Today, we can be completely destroyed in less than an hour, with no real alternative but to threaten to continue that process by releasing our own nuclear weapons.

The logic that led us to this state seemed reasonable, but the absurdity of the result is evidence that we need to re-examine the logic that brought us here. Until we root out those errors in our thinking (*old thinking*, in Einstein's view) and shift to a new mode of thinking that is consistent with the realities of the nuclear age, we will be unable to reach a state of acceptable risk.

During the amazing decade from 1985-1995, the world may have visited substates within the *New Thinking* super-state. Gorbachev's acceptance of the [INF Treaty](#) is a possible candidate. On the surface this Treaty was fair to both the US and the USSR since both agreed to totally eliminate their Intermediate-Range Nuclear Forces (INF). But that left the Soviet Union with no deterrent against Britain and France's nuclear weapons. Is it possible that Gorbachev, who frequently talked of the need for new thinking, actually engaged in it and realized that deterrence game is just a [big act](#)?

While discovering errors in our national security logic needs to be undertaken by society as a whole, so that the conclusions are generally accepted, I will list some candidate beliefs that may be at fault, along with comments that reflect my thinking about them:

The nation with the strongest military is the most powerful.

This is an understandable belief because it was true for most of humanity's tenure on Earth. But, does it enhance our security to have 10,000 nuclear weapons instead of 1,000? Or, does the difficulty of keeping track of so many weapons decrease our security by increasing the risk that terrorists will get their hand on one that [goes astray](#)?

If a crisis might lead to war, the nation that strikes first has a decisive advantage.

Again, this was true for most of humanity's tenure on Earth. Japan's surprise attack on Pearl Harbor gave it an early advantage in the Second World War¹. Similarly, the 1967 Israeli surprise attack on Arab airfields guaranteed who would win the Six Day War. (It also made the 1973 Yom Kippur War almost a requirement, so that the Arab world could reclaim some pride after a humiliating defeat.) But putting missiles with short flight times on hair trigger alert is a risky proposition. It is highly unstable for both the US and Russia to want to strike first, yet there is tremendous military pressure to do exactly that. This pressure also makes an accidental war more probable by delegating authority to field commanders at an early stage in a crisis. For a particularly egregious example, see Bruce Blair's [account](#) of how the PAL (permissive action link, a form of combination lock to prevent unauthorized use of a weapon) codes on Minuteman missiles were set to eight zeroes and posted on every missile silo's bulletin board!

Russia is a modern-day Nazi Germany. We need to stand up to the Russians at every possibility or our weakness will only invite worse aggression.

If this belief were true, humanity would have little hope of surviving. Fortunately, there is significant evidence that it is merely a powerful myth. A *Newsweek* [essay](#), written soon after the August 2008 Georgian war exemplifies the myth, while a very different possibility is reflected in conservative columnist Patrick Buchanan's [column](#) on that conflict. If you want to read further, check out another Buchanan [column](#), Stratfor's [analysis](#), a retired US Foreign Service Officer's [view](#), and Republican Congressman Dana Rohrabacher's [statements](#). And, most recently, the European Union's investigation concluded: "The proximate cause was the shelling by Georgian forces of the capital of the secessionist province of South Ossetia, Tskhinvali, on Aug. 7, 2008, which was followed by a disproportionate response of Russia." That quote is from a [New York Times OpEd](#) by Heidi Tagliavini, who chaired the investigation. The full report is in several volumes. For those interested, here are links to [Volume I](#), [Volume II](#) and [Volume III](#).

What about North Korea?

This is a detour from the rest of this handout, but worthwhile given the questions that have come up in class about North Korea and Iran's nuclear programs. Prof. Siegfried

¹ Japan did not intend for Pearl Harbor to be a surprise attack. The Japanese ambassador to Washington, Nomura, was supposed to deliver what Japan regarded as an effective declaration of war shortly before the attack occurred. However, he was delayed by two factors. The message was so highly classified that he did not trust his secretary to see it and had a higher ranked person type the message. But he was a slow, poor typist. Then, when Nomura appeared for his appointment with Secretary of State Hull, he was kept waiting.

Hecker, former Director of Los Alamos, has been a major player in attempts to resolve the disputes between our nation and North Korea, and has made numerous trips there. He had a paper "[Denuclearizing North Korea](#)," in the May-June 2008 issue of the *Bulletin of the Atomic Scientists* which said in part:

... During the past four years, I've visited North Korea's Yongbyon nuclear complex three times with nongovernmental teams of scientists and observers. My visits to the complex and my meetings with North Korean officials have convinced me that the elimination of North Korea's plutonium production capacity is within reach. ...

From 1994 to December 2002, International Atomic Energy Agency (IAEA) inspectors monitored the freeze of production facilities, while Yongbyon technical specialists were allowed to conduct periodic maintenance of the facilities. After the United States accused North Korea of operating a clandestine uranium enrichment program in October 2002, Pyongyang expelled the IAEA inspectors, withdrew from the Nuclear Non-Proliferation Treaty (NPT), and restarted its nuclear facilities.

Based on my February visit, I judge the disablement actions to be serious and in good faith. I believe that Pyongyang has made the decision to permanently shut down plutonium production if the other parties do their part. However, they have retained a hedge to be able to restart the facilities if the agreement falls through. ...

The Six-Party process has put within reach the possibility of permanently shutting down the entire Yongbyon plutonium production complex; it is highly unlikely that North Korea has clandestine plutonium production facilities. Eliminating Yongbyon's plutonium production is the highest technical priority for the parties negotiating with North Korea because doing so would dramatically reduce the risk posed by the North Korean nuclear program. To do so, these countries should put the burden on North Korea to finish disabling the Yongbyon complex and to begin dismantling it. During my February visit, North Korean Ministry of Foreign Affairs officials said that they have slowed the discharge of fuel from the reactor (one of the last disablement actions) because the other five parties had not lived up to their October 3, 2007 commitments. Specifically, as of February 14, 2008, only 200,000 tons of the promised 500,000 tons of heavy fuel oil had been delivered, and South Korea and China had provided very little of the promised 500,000 tons of heavy fuel oil equivalent. In addition, the United States had not removed North Korea from the states sponsoring terrorism list and had not terminated application of the Trading with the Enemy Act—two other conditions of the October agreement.

A few months ago, I asked him if his view had changed in light of North Korea's second nuclear test on May 25, 2009. He told me he was working on a paper that would answer that question, and he sent me an advance copy two days ago. He also gave me permission to share it with the class, and I will include it in my next email. (Of you're reading this and not in the class, I expect Prof. Hecker will post the paper to his [home page](#) in the near future. As I write this, the first paper listed deals with Iran's nuclear program and is also

likely to be of interest to you.) I've extracted what I view as the most relevant parts of this new paper here. It is entitled "Lessons learned from the North Korean nuclear crises," and will appear next week in *Daedalus*:

Security concerns have been the central driver of the North Korean ruling regime since the birth of the nation after World War II. ... The devastating Korean War, resolved only by an armistice, and the U.S. threat to use nuclear weapons likely moved Kim Il-sung to pursue nuclear weapons early on. ... The late 1960s were turbulent times in Pyongyang's relations with the West. South Korea's military was bolstered by U.S. troops and U.S. nuclear weapons on its soil. Pyongyang watched the Cuban missile crisis unfold in a manner that shed doubt on Soviet commitments to its allies. It witnessed the Sino-Soviet split and the Chinese Cultural Revolution. Each of these developments reinforced the notion that Pyongyang could only rely on itself for the North's security. Although Pyongyang fielded an immense conventional army and its deadly artillery along the Demilitarized Zone (dmz) was poised to destroy Seoul, nuclear weapons would help to balance the U.S. nuclear presence in the South. ...

By the early 1990s, Pyongyang's security environment deteriorated dramatically. ... Pyongyang was devastated by these changes and began seriously to explore accommodation with the West, especially with the United States. Carlin and Lewis 15 believe that Kim Il-sung made the strategic decision to engage the United States and even accept U.S. military presence in the South as a hedge against potentially hostile Chinese or Russian influence. ...

However, reconciliation between Washington and Pyongyang proved difficult, as Washington saw the Agreed Framework primarily as a nonproliferation agreement. ... the Agreed Framework was opposed immediately by many in Congress who believed that it rewarded bad behavior. Congress failed to appropriate funds for key provisions of the pact, causing the United States to fall behind in its commitments almost from the beginning. ... The Agreed Framework, which began as a process of interaction and cooperation, quickly turned into accusations of non-compliance by both parties. ...

the diplomatic crisis resulting from its 1998 rocket launch over Japan was resolved by the Perry Process ... The follow-up meeting between Secretary of State Madeleine Albright and Kim Jong-il that was held in Pyongyang a couple of weeks later appeared to put the nuclear crisis on a path to final resolution.

With the change in administrations in Washington, hope for a settlement was quickly dashed. Whereas Pyongyang was waiting for a U.S. response to the Perry Process, it ran into the Bush administration's adamant opposition to the terms of the Agreed Framework and to political accommodation. Pyongyang practiced restraint with the incoming Bush administration until North Korea was accused of a covert uranium enrichment program and saw the Agreed Framework come to an end. During the confrontation over enrichment in October 2002, First Vice Minister of

Foreign Affairs Kang Sok-ju told his American counterpart, “We are a part of the axis of evil....If we disarm ourselves because of U.S. pressure, then we will become like Yugoslavia or Afghanistan's Taliban, to be beaten to death.”¹⁸ Pyongyang withdrew from the npt and restarted its dormant Yongbyon facilities to produce fuel for a plutonium bomb.

Pyongyang's security fears were further heightened by the invasion of Iraq. Pyongyang now believed the bomb would assure its survival, so it no longer hid its nuclear weapons aspirations. ...

What can we learn from how and why North Korea built the bomb? North Korea is unlikely to give up its nuclear arsenal anytime soon because it has become crucial to how the regime assures its security. Nuclear weapons also play a supportive role domestically and provide diplomatic leverage. Pyongyang views its security concerns as existential. ...

As undesirable as it may sound, the best hope is a long-term strategy to contain the nuclear threat while tackling the North Korean problem comprehensively, but in discrete steps.²¹ Both Beijing and Seoul favor taking the long view. Time is not on Pyongyang's side. The greatest threat to the regime is not from the outside, but from within. ... And it is essential to stop Pyongyang from doing additional damage around the world through nuclear cooperation and exports. ...

The lessons of North Korea will not be lost on other potential proliferators, particularly Iran. Pyongyang broke new ground in defying international norms and took advantage of the international community's inability to respond effectively....

The Bush administration killed the Agreed Framework for domestic political reasons and because it suspected Pyongyang of cheating by covertly pursuing uranium enrichment. Doing so traded a potential threat that would have taken years to turn into bombs for one that took months, dramatically changing the diplomatic landscape in Pyongyang's favor. ...

The United States plays an indispensable role in proliferation prevention, but it can't go it alone. It cannot afford to sit at the sidelines as it has done with Iran. We found that Pyongyang was willing to slow its drive for nuclear weapons only when it believed the fundamental relationship with the United States was improving, but not when the regime was threatened. ...

The more divided we are at home, the more we yield advantage to the adversary. Political divisions in Washington in recent years resulted in our inability to negotiate the nuclear crisis effectively. American diplomats lament that it has been more difficult to negotiate in Washington than at the six-party table.

Brzezinski's role in creating al Qaeda

Some of you asked me to include links to the interview in which Jimmy Carter's National Security Advisor, Zbigniew Brzezinski, described his role in creating al Qaeda. Of course, that was not his goal, but it was the effect. This little known [interview](#) appeared in French in *Le Nouvel Observateur*, which I've been told is roughly their equivalent of *Newsweek*, so it is a reputable source. An [English translation](#) is also available. I checked the translation and it appears accurate. I only found two differences. The titles were not the same, but that is unimportant and may be due to the on-line and print versions using different titles; and the French version talks of Brzezinski playing a "key role in this affair" whereas the translation only says he played "a role in this affair." Again unimportant. If you read this interview, remember it took place in 1998, *before 9/11*.

Another nuclear optimism link

In going through my archives, I came across another [paper](#) ("The Mushroom Cloud That Wasn't," by Michael Krepon) espousing a form of nuclear optimism. I include it here to help give you a better perspective on those whose views differ from my own. If any of you find good papers with that viewpoint, please bring them to my attention.

The print version had a footnote: "Krepon is Co-Founder of the Henry L. Stimson Center, a Diplomat Scholar at the University of Virginia, and the author of *Better Safe than Sorry: The Ironies of Living With the Bomb*." Here are some excerpts that speak to the:

The threat of nuclear armageddon is overblown ... not a single death has occurred as a result of nuclear terrorism, [yet] ... warnings of the possibility of nuclear, chemical, or biological weapons attacks are as loud as ever ... [Perhaps] the threat itself has been greatly exaggerated ...

Experts cite such worrisome developments [as Iran and North Korea] and then use threat inflation to seize the public's attention and to secure sufficient appropriations for their preferred remedies. ... As real as these threats are, hyping them carries its own risks. Crying wolf too often can lead to complacency when action is needed most. Repeated warnings can also prompt taxpayers and lawmakers to question what was gained from prior investments in reducing threats and so limit appropriations for new ones. This is a major problem, since remedial efforts over short periods of time are insufficient; reducing the nuclear threat requires success over the long haul.

Most important, fear-based strategies lead to wasteful spending and costly errors in judgment. Dire warnings of impending nuclear dangers during the Cold War led the United States and the Soviet Union to produce a staggering 125,000 nuclear warheads and test an average of one nuclear weapon per week between 1962 and 1989 ... All of the policies that successfully prevented a nuclear catastrophe from occurring during the Cold War -- containment, diplomacy, deterrence, conventional military strength, and arms control agreements -- can be employed even more effectively today. ...

Nitze, the man who repeatedly warned of impending nuclear disasters, also offered the perfect mental antidote to scaremongering. He advised U.S. officials to "try to reduce the dangers of nuclear war within the relevant future time period as best you can; you just get depressed if you worry about the long term." The best counter to nuclear pessimism is, Nitze advised, to "work the problem" methodically and persistently, day by day.

While I disagree with Krepon that "the threat of nuclear armageddon is overblown," I agree with him on a number of points (most not copied above since I was focusing on passages that support nuclear optimism), such as the value of the Nunn-Lugar program, the danger of over-reacting out of fear, etc. But I believe he's wrong to call it "crying wolf" just because the worst has not happened.