

STS152: Nuclear Weapons, Risk and Hope

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Reading

Please read this handout. If any sections seem particularly valuable, not needed, in need of clarification, or you have more general comments, please let me know via email. The same applies to all previous handouts. I will appreciate your help in improving them.

Is there hope of reducing the risk?

If my [preliminary analysis](#) is correct and the risk posed by nuclear weapons is thousands of times greater than living next to a nuclear power reactor, that leads to another key question: Is there any hope of reducing the risk thousands of times over, until it reaches an acceptable level? Are human beings capable of such monumental change?

Prof. Carol Dweck's Research

Many people dismiss reducing the risk posed by nuclear weapons as an impossible task and have told me: "You can't change human nature!" Useful insights for overcoming this barrier to facing what must seem like an important, but unsolvable challenge can be gained from the [research of Prof. Carol Dweck](#) of Stanford's Psychology Department.

Dweck studies how different people respond when confronted with a challenge that exceeds their current abilities, and how different stimuli might affect their responses. She found that some people rise to the challenge even though that might mean failing, while others shy away, fearful of failure. Her research has shown that much of this difference can be attributed to people tending to have one of two mindsets. In one mindset, ability is fixed and immutable, something you are born with and cannot change. In the other, ability is more like a muscle that can be developed by exercise and hard work.

Dweck has found that people who see ability as fixed and immutable have a strong tendency to shy away from challenges that are above their current ability and would – in their mindset – find them wanting. Conversely, she has found that people who believe ability can be improved through hard work tend to welcome such challenges as growth opportunities.

Dweck's research also found that it is possible to influence a person's response to such challenges. As described on pages 24-26 of her book, *Self Theories*:

We've succeeded in influencing students' theories of intelligence in other studies as well. One such study, with college students, was conducted by Randall Bergen (Bergen, 1992). For the study, Bergen wrote two *Psychology Today*-type articles, complete with graphics. Through the use of vivid case studies in what was said to be the latest scientific research, each article made an extremely compelling case for one of the theories [either that ability is innate and immutable or that it can be

developed through effort]. In fact, even other graduate students in our lab, not knowing the origins of the articles, believed they were real. ...

[Both articles began by describing an eight-month old baby, named Adam, who had exceptional abilities, normally not seen until ages three or four.] ... The entity theory article [the first mindset] went on to explain Adam's exceptional abilities in terms of fixed, innate intelligence, concluding that the brilliance of Mozart and Einstein was mostly built into them at birth:

Their genius was probably a result of their DNA, not their schooling, not the amount of attention their parents gave them, not their own efforts to advance themselves. These great men were probably born, not made.

The incremental theory article [the second mindset, which believes that ability can be developed by hard work] began the same way but went on to explain baby Adam's unusual abilities in terms of his challenging environment. They concluded that the brilliance of people such as Leonardo da Vinci and Albert Einstein was a result of their actions and their environments, not their genes.

Bergen found that the articles had a clear impact on students' theories of intelligence and on their persistence in the face of failure, a topic we take up in the next section.

Ying Yi Hong, C. Y. Chiu, Derrick Lin, and I (Hong *et al*, 1998, study 4) also used these articles to influence college students' theories of intelligence. This study was designed as a follow-up to the study we just described, in which entering freshmen were asked about their interest in a remedial English course that could aid their scholastic performance.

The aim of this next study was to see if students who were given an entity theory of intelligence would pass up a chance to enhance their deficient skills, just as the students with entity theories had done in the original study. In this study, college students were first given Bergen's *Psychology Today*-type articles as part of their reading comprehension test. Half of them read the vivid and convincing version that espoused the entity theory and the other half read the vivid and convincing version that espoused the incremental theory. After answering some questions about the passage they had read, students went on to the second part of the study, a nonverbal ability test.

Here they worked on the set of problems and received feedback that they had done relatively well ... or relatively poorly ... However, before moving to the next set of problems, students were offered a tutorial "that was found to be effective in improving performance on the test for most people." All the students had room for improvement. The question was: Who would take advantage of this tutorial?

Interestingly, most of the students who had done fairly well elected to take the tutorial. Of the students who had done relatively well, 73.3% of those given an

incremental theory and 60.0% of those given an entity theory said they wanted to take the tutorial. ...

Among those who had done poorly, a different story emerged. The students who were exposed to the incremental theory still wanted to do tutorial (73.3% elected to take it). However, those who were exposed to the entity theory rejected the opportunity to improve their skills. Only 13.3% of the students in this group said they wanted to take the tutorial. Once again, when students have a fixed view of intelligence, those who most need remedial work are the ones who most clearly avoid it.

In short, we have shown that it is possible to influence students' theories about their intelligence, and that when we do so we influence their goals and concerns. Those who were led to believe their intelligence is fixed begin to have overriding concerns about looking smart and begin to sacrifice learning opportunities when there is a threat of exposing their deficiencies. Those who are led to believe their intelligence is a malleable quality begin to take on challenging learning tasks and begin to take advantage of the skill improvement opportunities that come their way.

Dweck's research has been concerned with individual abilities and mindsets about the self, but the same ideas seem applicable to a person's view of humanity as a whole. In a meeting I had with her, she agreed that the hypothesis sounded reasonable. Extended in that way, her results would imply that, if someone believes human nature is fixed and immutable, then bringing up concern for the nuclear threat will tend to fall on deaf ears. I had been hearing people say, "You can't change human nature!" for twenty-five years before I came across Dweck's research, but when I did, it gave that response a new context. These people were more likely to hold the entity theory mindset, while those who responded more positively were more likely to hold the incremental theory mindset.

This realization, coupled with the above-described experiments on influencing mindset, emphasized the need to couch the problem within a broader context that emphasizes humanity's capacity for change. While I had been doing that at an intuitive level for almost thirty years, coming in contact with Dweck's research brought that need into clearer focus.

Fortunately, there is a good response to "You can't change human nature!" *Human nature is to change*. Contrary to the belief that human nature is fixed and immutable, adaptability is our species' defining characteristic. Through adaptations of clothing and shelter, we have extended our range from a small tropical region to the entire globe. Through other adaptations, we have learned to fly far higher than birds, out swim fish, and even walk on the Moon.

We have also adapted our social structures in ways initially thought to be impossible. Abolishing slavery, a laughable idea two hundred years ago, became the law of the land five decades years later. Women's suffrage, which initially was seen as even more

unthinkable, also came to pass. History shows that we have changed what seemed like immutable aspects of human nature when far less was at stake. Changing to ensure our survival is certainly within our power.

When we look back from today's vantage point on slavery and women's object subjugation, we tend to wonder how people could ever have been so inhuman. But, in viewing those changes through that negative prism, we miss the miracle that individuals wrought in bringing about those positive societal upheavals. We need to reframe that "glass half empty" view and see those changes for what they were – astounding miracles in which ordinary citizens played the key role. In contrast the "half empty" view reinforces a belief system in which humanity is deficient and therefore incapable of change. The next section examines one of those societal changes in more detail.

Was there hope of abolishing slavery?

Not so long ago, most people thought slavery was an immutable part of human nature. It was sanctioned in the Bible, present in varied civilizations throughout history, and had a powerful "agro-slavery complex" supporting the institution. In that environment, questioning slavery was seen as a fool's errand. In consequence, in the election of 1840, anti-slavery candidate James Birney received just 0.3% of the vote. Twenty years later, after enough people had challenged that conventional wisdom, Abraham Lincoln became president. In the same way, little will change with respect to nuclear weapons until enough of us have the courage to question conventional wisdom and undertake what many will see as a fool's errand.

To get an idea of how powerful society's mindset was concerning slavery, consider the following excerpts from an [1856 speech](#) 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 (**in boldface**) along with similar arguments made in recent years concerning nuclear weapons (*in italics*). Where possible, the latter are quotes from others. In others, I have had to compose them myself.

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.

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.

Prof. Yuri Zamoshkin and the Grenzsituation

One of my favorite perspectives that gives hope for humanity overcoming what may seem like insurmountable odds comes from the late Prof. Yuri Zamoshkin¹, a man with whom I had the great honor of working and who made important intellectual contributions to the Soviet reform movement of the 1980's:

In the philosophy of twentieth-century German and French existentialists (notably K. Jaspers), the term *grenzsituation* (border situation) has been used to designate an experience in which an individual comes face-to-face with the real possibility of death. Death is no longer merely an abstract thought, but a distinct possibility. Life and death hang in the balance.

Different human beings respond to the *grenzsituation* in different ways. Some become passive and put their heads on the chopping block, so to speak. Others experience something akin to a revelation and find themselves capable of feats they never before would have thought possible. In a *grenzsituation*, some timid individuals have become heroes; some selfish individuals have become Schweitzers. And sometimes, in so transcending their normal personalities, they cheat the grim reaper and survive where normally they would not.

¹ Zamoshkin's paper, from which this excerpt is taken, is accessible [on line](#). Zamoshkin's paper was part of a book, *Breakthrough: Emerging New Thinking*, and the other papers in that collection also are available [on line](#). *Breakthrough* was published late in 1987, during the period of extremely rapid change in the Soviet Union. It appeared simultaneously in Russian there and in English in the West. I was privileged to be the Western Editor of the volume.

Until now, this notion has been applied only to individuals. But I am convinced that today it can be purposefully applied to the world as a whole. The present day global *grenzsituation* resides in the possibility for global death and global life.

This situation, for the first time in history, directly, practically, and not purely speculatively, confronts human thought with the possibility of death for the entire human race. The continuity of history, which earlier had seemed to be a given, suddenly becomes highly questionable.

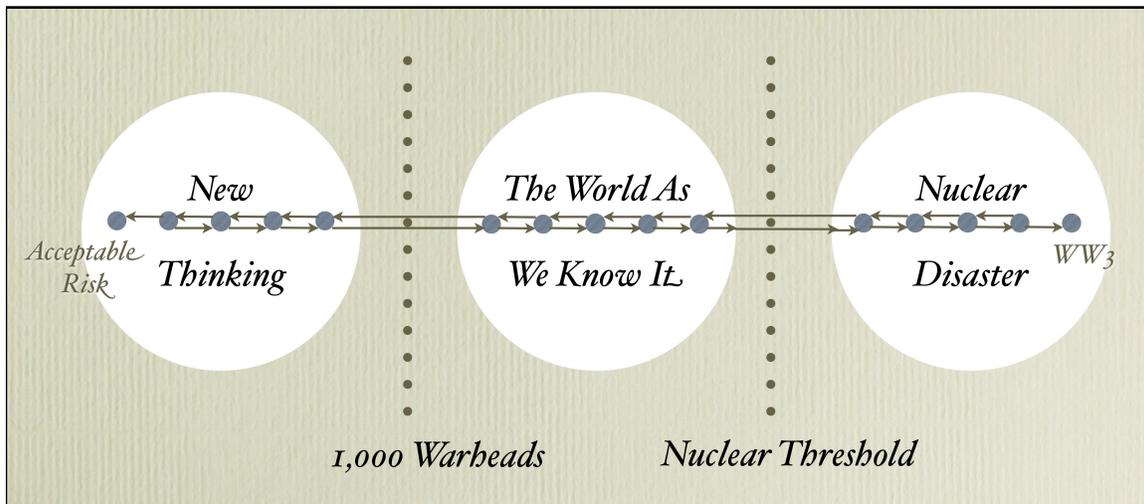
As with the individual, this global *grenzsituation* may contribute to a “revelation” in human thinking and to a positive change of character previously thought impossible for our species. ...

Of course there is also the possibility that, faced with a *grenzsituation*, mankind will go passive and put its collective head on the nuclear chopping block. But before we can learn our true mettle, we must bring the global *grenzsituation* into clear focus for all humanity. Society must see that it has but two possibilities, global life or global death.

As Zamoshkin concludes so eloquently, the first key step in defusing the nuclear threat is to bring the risk posed by nuclear weapons into clearer societal focus. Only after that has been accomplished can we learn whether human nature will succumb to the nuclear challenge or triumph over it.

Starting With Pockets of Nuclear Awareness

Bringing the global *grenzsituation* into clearer focus might seem like a small step, but gains importance when viewed in terms of the state diagram introduced in handout #2 and repeated below.



Just at the negative possibility of a global nuclear war is almost inconceivable until risk analysis breaks it down into a sequence of smaller errors, the positive possibility also

becomes clearer when viewed as a sequence of smaller steps. The intermediate goal becomes crossing the *New Thinking* threshold via a 95% reduction in the worldwide nuclear arsenal, from its current level of approximately 20,000 to 1,000.

A world with a thousand nuclear weapons still is very dangerous, but much less so than at present. It would allow 300 nuclear weapons each in the American and Russian arsenals and 400 distributed among other nuclear-armed nations. A [statement](#) I authored and that has been endorsed by a former nominee for Secretary of Defense, states that “a few hundred [nuclear weapons] would more than deter any rational actor and no number will deter an irrational one.” Thus, while crossing the *New Thinking* threshold will require fundamental changes in our thinking, it does not require fundamental changes in our military strategy and is therefore more difficult to argue against than

Once that intermediate goal has been achieved, it is critical that work continue until a state of acceptable risk has been reached.² Unlike at the end of the Cold War, when hard-won public support was lost due to premature declarations of victory, it is essential to keep the ultimate goal in mind.

Backing up from the intermediate goal of crossing the *New Thinking* threshold, how can we start the process? What immediate goals are reasonable, yet have the potential to start a long-term process of change? Currently, I am experimenting with creating pockets of nuclear awareness, as explained on a [portion of my web site](#) that is part of this week’s required reading. A [letter of encouragement](#) from former Supreme Court Justice Sandra Day O’Connor is optional reading.

It is audacious to think that a small group of Stanford students could be the catalyst for solving this immense problem. But equally inconceivable events have occurred in the past. Instead of dismissing the inconceivable by saying “That will happen when pigs fly” or “when Hell freezes over,” a friend of mine used to say “That will happen when the Berlin Wall comes down.” When the Berlin Wall came down in 1989, that friend told me he was going to have to re-examine a number of seemingly inconceivable possibilities.

Never doubt that a small group of thoughtful, committed citizens can change the world. Indeed, it is the only thing that ever has. Margaret Mead

² Defining the ultimate goal implicitly as a state of acceptable risk has some advantages over an explicit definition such as “world peace” or “nuclear abolition.” The explicit definitions assume hypotheses that are points of heated debate. The implicit or operational definition is much harder to argue against and, if proponents of one or more explicit goals are correct, that can be discovered farther out in the process, when those goals do not appear as naive and unachievable.