Rethinking rationality in nuclear strategy

Psychological biases and policy implications

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> Here we stand in the middle of this new world with our primitive brain, attuned to the simple cave life, with terrific forces at our disposal, which we are clever enough to release, but whose consequences we cannot comprehend.
>
> Albert Szent-Gyorgyi

Nils-Eric Sahlin has always thought deeply about rationality and ethics in the context of difficult decisions in medicine and other important domains pertaining to valuing lives and protecting them. In keeping with his contributions to ethical dilemmas in lifesaving, I shall briefly describe recent psychological studies pertaining to one of the most difficult, ethically challenging, and consequential decisions any human being would ever face: Whether to order the use of nuclear weapons to vanquish an enemy.

The question of nuclear weapons management remains one of the most critical issues of the 21st century. While nuclear deterrence has seemingly prevented large-scale wars since 1945, recent advancements in nuclear technology, increased global proliferation, and shifting political dynamics pose significant risks. Despite six decades of research into decision-making, nuclear policy remains largely insulated from the many important findings from this research. Research seeks to bridge that gap by examining the psychological mechanisms that influence nuclear decision-making, the cognitive biases that may lead to miscalculations, and the policy interventions required to mitigate existential risks.

The assumption of rationality in nuclear deterrence

Traditional nuclear deterrence theory is built on the assumption that state actors are rational decision-makers who, when provided with accurate information, will make choices that maximize national security. This perspective holds that nuclear weapons serve primarily as tools for war prevention rather than warfighting. As Admiral Richard Mies, former head of the United States Strategic Command, has asserted, nuclear weapons act as a deterrent against major wars and ensure strategic stability. However, research in psychology challenges this notion by demonstrating that decision-making is often subject to cognitive and emotional limitations that significantly alter and destabilize decisions.

Deterrence assumes that all actors involved will act predictably and in their best interest. But history has shown that world leaders are not immune to misjudgments. The Cuban Missile Crisis of 1962 exemplifies how close the world came to nuclear annihilation due to miscalculations and misunderstandings between the United States and the Soviet Union. Modern nuclear strategy continues to rest on the assumption that rational leaders will never deliberately initiate a nuclear war, yet this assumption disregards the emotional and psychological pressures that can drive decision-making in times of crisis.

Psychological challenges to rationality in nuclear decision-making

Decision-making operates through two primary cognitive systems: System 1 (experiential) and System 2 (analytical). System 1 relies on intuition, emotions, and narrative reasoning, while System 2 engages in deliberative, logical processing. Although both systems play a role in decision-making, high-stakes military conflicts, forcing decisions to be made in novel situations under emotional stress and severe time pressure, are likely to favor System 1, leading to irrational choices driven by affective responses rather than careful, reasoned analysis.

One such affective response is *psychic numbing*, wherein individuals struggle to emotionally appreciate large-scale human suffering. Research has demonstrated that as the number of victims in a crisis increases, emotional engagement decreases, leading to diminished motivation to prevent

mass casualties.[1] Studies have found that people tend to respond emotionally to singular, identifiable victims, yet struggle to grasp the gravity of mass casualties.[2] A large body of research can be summarized by the troubling conclusion that "the more who die, the less we care".[3] This cognitive shortcoming has profound implications for nuclear decision-making. It means that leaders making nuclear-related decisions will certainly fail to appreciate the full scale of destruction that can be caused by a nuclear strike.

Another cognitive bias relevant to nuclear policy is the *prominence effect*, which describes the tendency to prioritize a single dominant factor while neglecting other critical considerations. In nuclear strategy, this often manifests as an overriding emphasis on national security and military advantage, while ethical considerations regarding civilian casualties and environmental devastation receive little or no attention. This can lead to disproportionate military responses, including the use of nuclear weapons against civilian populations.

A notable example is the 1945 decision to drop atomic bombs on Hiroshima and Nagasaki. While military leaders justified the bombings as a means to end World War II swiftly and minimize further troop losses on both sides, ethical considerations about civilian casualties were largely overlooked. The prominence effect explains why leaders may prioritize immediate security concerns over long-term humanitarian and civilizational impacts.

Findings from online survey experiments

Our understanding of the ways cognitive limitations and emotional biases may affect decisions about the use of nuclear weapons has been greatly informed by online survey experiments originally designed by political scientists Scott Sagan and Ben Valentino and replicated and extended by my colleagues and me.[4] One recent study, involving nearly 3,000 American participants, presented respondents with a grim choice: Continue a difficult but winnable ground war with escalating American troop casualties or launch a nuclear strike to end the war quickly and save the lives of the troops but kill up to 2 million enemy civilians. The findings were as startling as they were unsettling. Even when faced with the prospect of losing as few as 100 American lives—a number that seems trivial against

the backdrop of national security—over 20% of respondents opted for the nuclear strike. As the projected casualties increased to 40,000, support for the nuclear option surged to 50%.

Support for nuclear strikes correlated strongly with conservative political ideologies, pro-death penalty attitudes, and restrictive immigration and abortion policies. In other words, we found that individuals with punitive worldviews were far more likely to endorse extreme military actions, including nuclear strikes.

Survey participants also demonstrated *scope insensitivity*, a form of *psychic numbing*, when they exhibited similar support for nuclear strikes regardless of whether the projected death toll was 100,000 or 2 million civilians.

Another disturbing finding was that adding a second nuclear strike option to the choice set, one much better than the other, greatly increased the percentage of respondents who chose to bomb civilians rather than continue the ground war. For example, when presented with two nuclear strike options—one causing 100,000 deaths and another causing 2 million, along with the option of continuing the ground war—many respondents, even those who had preferred the ground war at an earlier occasion, now chose the 100,000-death bomb, calling it the "better option". Their explanations for their preference reversal shows they deceive themselves into feeling virtuous by saving the troops and expecting to kill 100,000 civilians with a better bomb, rather than rejecting nuclear use altogether. We have named this "the curse of betterness", a phenomenon where decision-makers rationalize the lesser of two evils as an acceptable course of action. It is related to a deception well known to marketers and consumer psychologists, who have named it the *decoy effect*. It is used to make one's product sell better against a competitor's product by creating another product clearly inferior to one's favored product, thus enhancing the attractiveness of the favored product against the competition.

The implications of these findings are both profound and disconcerting. In a nuclear age marked by the constant threat of miscalculation, it is chilling to consider that the decisions made by our leaders—decisions that are supposed to be guided by sober, strategic calculation—might instead be swayed by the same cognitive biases that lead us to overvalue a better bargain at the supermarket. When the stakes involve not just financial loss but the potential extinction of millions, such biases

are not merely inconvenient quirks of human psychology: they are existential risks.

Current nuclear deterrence strategy rests on the assumption of rational decision-making, a presumption that this research calls into question. If top military and political leaders are susceptible to the influence of affect, security prominence, comparison effects, and psychic numbing, then the stability of deterrence could be more precarious than we imagine. The possibility that a punitive leader might one day be swayed by the "better bomb" effect—a cognitive bias that makes a catastrophic but less devastating strike appear more acceptable—should send shockwaves through policy circles and the public alike.

In confronting these unsettling realities, we are compelled to rethink how we manage nuclear arsenals and design the decision-making processes that govern their use. The research suggests an urgent need for institutional safeguards that account for the inherent limitations of human cognition. Training programs, decision support systems, rigorous checks and balances, attention to the character of the president and our top military advisors, and renewed and enforceable arms-control treaties, must be reexamined in light of these psychological vulnerabilities.

As policymakers and citizens, we must confront the uncomfortable truth that our decision-making processes, however evolved, are ill-equipped to handle the moral and strategic complexities of nuclear war. We must strive for a new paradigm of nuclear policy—one that recognizes and mitigates the cognitive biases that could, in a moment of crisis, propel us toward irreversible harm to civilization.

Notes

1. Slovic 2007.
2. Västfjäll *et al*. 2014; see also Slovic 2007.
3. Slovic & Västfjäll 2015.
4. Slovic *et al*. 2020; Slovic *et al*. forthcoming (2026).

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