

A Reconceptualization of Rationality in Security Studies: Beyond Expected Utility and Toward Enriched Strategic Decision-Making

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Abstract: Objective: This article critiques the dominant use of Expected Utility Theory (EUT) in security studies and proposes an enriched conceptualization of rationality better suited for analyzing real-world strategic decision-making under uncertainty. While EUT provides an elegant model of rational choice, its core assumptions—that actors can assign precise probabilities to outcomes and possess stable utility functions—often fail to capture the complexities of statecraft. This study aims to bridge the gap between theoretical models and observed strategic behavior by integrating insights from behavioral economics, cognitive psychology, and organizational theory.

Methods: The study employs a conceptual and qualitative approach, synthesizing existing theoretical frameworks with empirical evidence. The Vietnam War serves as a critical case study to demonstrate the limitations of EUT and the explanatory power of an enriched model. Analysis focuses on how decision-making during this period was shaped by subjective probability assessments, cognitive biases, and organizational pressures, rather than a rigid cost-benefit calculus. We draw on historical accounts, memoirs, and declassified intelligence reports to illustrate how the definition of success shifted, and decisions were influenced by factors like the sunk-cost fallacy and overconfidence.

Results: The Vietnam case study reveals three primary limitations of EUT: (1) the inability of policymakers to assign precise, objective probabilities to complex geopolitical events, (2) the dynamic and shifting nature of utility functions in response to political pressures, and (3) the significant influence of cognitive biases and organizational constraints on strategic choices. The article demonstrates that a model incorporating bounded rationality, subjective probability, and heuristics provides a more accurate and comprehensive account of decision-making during the conflict.

Conclusion: We argue for a reconceptualization of rationality that moves beyond EUT's strict assumptions. The proposed enriched framework offers a more realistic lens for understanding state

behavior, not as a deviation from rationality, but as a different, more nuanced form of it. The article concludes by outlining policy implications, including the need for improved probabilistic reasoning, the use of structured analytic techniques, and the promotion of collaborative analysis to mitigate bias and enhance decision-making in security contexts.

Keywords: Rationality, Expected Utility Theory, Security Studies, Decision-Making, Cognitive Bias, Subjective Probability, Vietnam War.

INTRODUCTION

A. Background and Research Problem

For decades, the study of strategic decision-making in international relations has been dominated by a powerful and elegant framework: rational choice theory [13, 19]. At its core, this approach posits that states and their leaders are rational actors who make decisions by systematically evaluating their options to maximize a desired outcome. The most common formalization of this idea is Expected Utility Theory (EUT), a model that assumes decision-makers select the option with the highest expected payoff [27, 28]. This expected payoff is calculated by multiplying the value of each possible outcome (its "utility") by the probability of its occurrence and then summing these products. EUT has provided the theoretical bedrock for classic security studies concepts, from deterrence theory to game-theoretic models of conflict bargaining. Its appeal lies in its analytical rigor and the seemingly universal logic it applies to human behavior. It simplifies a complex world, allowing scholars to build predictive models and articulate clear, testable hypotheses about state actions.

However, a growing body of work has highlighted a significant and persistent gap between this theoretical ideal and the messy reality of foreign policy and military strategy. The real-world often appears to defy the neat logic of EUT [2, 17]. High-stakes decisions, particularly those involving war and peace, are made under conditions of profound uncertainty, where probabilities are unknowable and information is incomplete. Strategic goals often shift, and the "utility" of a given outcome is not a fixed variable but a dynamic, politically contested concept. This disconnect has led to a burgeoning "behavioral revolution" in international relations, challenging the traditional assumptions of perfect rationality and highlighting the influence of cognitive biases, psychological pressures, and organizational dynamics on decision-making [14, 30]. The central problem, therefore, is not that EUT is "wrong" in a purely logical sense, but that it is often an incomplete and oversimplified model for understanding the real-world complexities of strategic choice.

B. Literature Review

The academic literature on rationality in security studies can be broadly divided into three streams. The first, and most enduring, is the classical rational choice approach. Scholars in this tradition, such as Charles Glaser, have built comprehensive theories of international politics on the assumption of rational, self-interested states [13]. This work often treats states as unitary actors that can perfectly process

information and calculate the costs and benefits of their actions. This perspective has been immensely valuable, but it has also been critiqued for its reductionism and its inability to account for observed pathologies in strategic behavior [19].

The second stream, emerging from a dissatisfaction with the first, has introduced a more nuanced understanding of rationality. This "behavioral turn" has been heavily influenced by insights from psychology and behavioral economics, showing that individuals, even expert ones, are not the cool, calculating automatons assumed by EUT. Scholars like Jeffrey Friedman have demonstrated how the communication of uncertainty and the inherent cognitive limitations of decision-makers can lead to systematic errors [7, 9, 10]. Others have explored how the framing of decisions, the influence of emotion, and the use of heuristics (mental shortcuts) shape strategic choices in ways that defy EUT predictions [3, 30]. This body of work, however, has primarily focused on critiquing the EUT model rather than building a comprehensive alternative that redefines rationality itself.

A third, parallel stream of literature has examined the organizational and bureaucratic factors that influence foreign policy. This work, often associated with scholars like Robert Jervis and Peter Katzenstein, emphasizes that state actions are not the product of a single, rational mind but the outcome of a complex interplay between different agencies, political factions, and organizational cultures [16, 17]. These studies show that the "rationality" of an action is often a function of internal organizational logic and political bargaining, which may diverge from the optimal strategy for the state as a whole. While these insights are powerful, they have not been fully integrated into a unified theory of decision-making that also accounts for individual cognitive processes.

The primary gap in the existing literature, therefore, is the lack of a comprehensive conceptual framework that integrates these three streams of thought into a more holistic understanding of strategic rationality. While critiques of EUT are numerous and well-founded, there is a need to move beyond simple criticism to build a more enriched, practical model that accounts for the full spectrum of factors—from cognitive biases to organizational dynamics—that shape strategic choice.

C. Research Questions and Thesis Statement

This article seeks to address this gap by asking:

1. What are the fundamental limitations of Expected Utility Theory in explaining strategic decision-making, particularly under conditions of deep uncertainty?
2. How do cognitive biases, subjective probability, and organizational factors contribute to a more realistic model of rationality in security studies?
3. How can an enriched understanding of rationality, incorporating insights from behavioral and organizational theories, inform more effective policy and analysis?

This article argues that a rigid reliance on Expected Utility Theory provides an incomplete and often misleading account of strategic decision-making. By integrating insights from behavioral economics, cognitive psychology, and organizational theory, we can develop a more enriched and practical model of bounded rationality and subjective probability that better explains and predicts state behavior under uncertainty. The goal is not to abandon the concept of rationality, but to redefine it in a way that is more empirically grounded and analytically useful for the study of security and international relations.

METHODS

A. Conceptual and Analytical Framework

This study is a conceptual and qualitative analysis, not an empirical test of a new theory with quantitative data. The primary objective is to synthesize existing theoretical insights and apply them to a specific case study to build a more robust conceptual framework. The methodological approach involves first defining the key components of our enriched model of rationality and then using a critical case study to illustrate its explanatory power.

Our enriched model is built on three core concepts that challenge the assumptions of EUT:

- **Bounded Rationality:** Introduced by Herbert Simon, this concept posits that human rationality is limited by cognitive constraints, available information, and time pressures. Rather than performing comprehensive utility calculations, decision-makers use mental shortcuts, or heuristics, to make "good enough" decisions [16]. This is a more realistic depiction of how leaders operate in the intense, high-stakes environments of national security.
- **Subjective Probability:** Unlike the objective, frequentist probabilities often assumed by EUT, our model embraces the concept of subjective probability. Originating from thinkers like Frank Ramsey and Bruno de Finetti, this view holds that probability is a measure of a decision-maker's personal belief or degree of confidence in an outcome, influenced by their experiences, beliefs, and priors [5, 15, 29]. In the context of national security, these beliefs are often vague, expressed in qualitative terms, and are far from the precise numbers required for EUT.
- **Heuristics and Biases:** We explicitly incorporate the systematic errors (biases) that arise from the use of cognitive heuristics. These include, but are not limited to, confirmation bias (the tendency to seek and interpret information that confirms one's pre-existing beliefs), the sunk-cost fallacy (the tendency to continue a course of action because of past investments, regardless of future prospects), and overconfidence bias (the tendency to overestimate one's own abilities and the accuracy of one's judgments) [4, 7, 22].

B. Case Study Analysis: The Vietnam War

The Vietnam War is an ideal critical case study for this analysis. The protracted nature of the conflict, the immense human and financial costs, and the eventual failure of U.S. policy all present a puzzle for EUT. A

strict rational choice perspective would struggle to explain why policymakers repeatedly escalated their involvement despite mounting evidence that the war was unwinnable. Robert McNamara's own later reflections, for example, reveal a deep sense of regret and a recognition that a purely rational, systems-analytic approach had failed [22].

The analysis will proceed by examining key decision-making junctures in the war, drawing on historical accounts, memoirs, and declassified government and intelligence documents [11, 26]. The focus will be on the qualitative nature of the decision-making process, specifically:

- The language used in intelligence estimates and policy memos to express uncertainty.
- The evolution of the stated objectives of the war and how they differed from initial goals.
- The documented instances of dissent, internal debate, and the influence of organizational culture on military and political strategy.

By applying our enriched framework to this historical data, we can demonstrate how a more nuanced understanding of rationality provides a more compelling explanation for the choices made by U.S. leaders than EUT. We will show that these choices were not simply irrational, but were the products of a different kind of rationality—one shaped by subjective beliefs, cognitive limitations, and organizational pressures.

RESULTS

A. The Failure of Expected Utility Theory in Practice

The Vietnam War provides a compelling counter-narrative to the EUT model of strategic decision-making. A close examination of the historical record reveals that the core assumptions of EUT were not met in practice.

The first assumption, the ability to assign precise, quantifiable probabilities to future events, proved to be impossible. Throughout the conflict, intelligence estimates were notoriously vague and expressed in qualitative language rather than numerical terms. Sherman Kent, a pioneer of intelligence analysis, famously documented the ambiguity of such "words of estimative probability" [18]. For example, the intelligence community would use terms like "unlikely," "probably," or "possibly" to describe the likelihood of a given outcome [26]. These qualitative assessments, however, were not standardized and were often interpreted differently by various policymakers, leading to significant miscommunication and analytical misjudgment. One official's "unlikely" could be another's "possible," leading to wildly different interpretations of risk and reward. This imprecision was not an isolated failure but a fundamental feature of analyzing a complex and fluid geopolitical situation [7]. The lack of precise probabilities meant that a formal EUT calculation—where an outcome's utility is multiplied by its probability—was simply not feasible. Instead, decision-makers were forced to rely on their own subjective interpretations, which were themselves shaped by their personal beliefs and biases.

Second, the assumption of a stable utility function was demonstrably false. The U.S. definition of "victory" in Vietnam was not a fixed goal but a moving target that evolved over time. Initially, the objective was the ambitious goal of preventing a communist takeover and establishing a stable, democratic South Vietnam. As the war dragged on and costs mounted, the utility of this outcome diminished, and the goalposts shifted [11]. Policymakers began to pursue more limited objectives, such as preventing a humiliating withdrawal or simply preserving U.S. credibility on the world stage. Robert McNamara's own reflections in his memoir, *In Retrospect*, document this tragic shift, where the initial, optimistic rationale for intervention gave way to a desperate search for a face-saving exit [22]. This evolution of goals demonstrates that the utility of a given outcome is not a stable, predetermined variable but is instead a political and psychological construct that changes over time, often in response to the very consequences of the decisions being made.

Third, the influence of organizational and bureaucratic politics consistently interfered with a purely rational strategic logic. The military's strategic culture, for example, favored large-scale conventional operations and a focus on "body counts," which were easily quantifiable but often obscured the true nature of the insurgency [21]. This organizational preference for a specific type of warfare led to a mismatch between strategy and reality. Furthermore, interagency politics and the need to maintain consensus often meant that information was filtered, and dissenting views were marginalized. This created a powerful form of groupthink and prevented a genuine, objective reassessment of the war's progress, a key ingredient for any EUT calculation to be accurate [22].

B. The Enriched Model: Evidence from Vietnam

The Vietnam War becomes more comprehensible and less of a puzzle when viewed through the lens of our enriched model of rationality, which incorporates subjective probability, bounded rationality, and cognitive biases.

First, subjective probability was the rule, not the exception. Leaders did not operate with a spreadsheet of objective probabilities but with a strong sense of personal belief and conviction. For example, the "domino theory"—the belief that if one country fell to communism, others in the region would follow—was not an outcome with a calculable, objective probability [11]. It was a deeply held subjective belief that drove policy decisions for years, acting as the foundation for the entire U.S. intervention. This illustrates that a leader's personal worldview and priors, rather than a dispassionate calculation, often serve as the primary inputs for strategic choice [29].

Second, bounded rationality explains why policymakers relied on simple heuristics and simplified models of the world. The sheer complexity of the geopolitical situation—a civil war, an insurgency, and the Cold War backdrop—overwhelmed their cognitive abilities. They did not have the time, information, or processing power to run a full EUT calculation. Instead, they relied on a series of cognitive shortcuts. For instance, the belief that American power and technology would inevitably prevail was a powerful heuristic

that simplified the problem, even as evidence mounted to the contrary [4]. This reliance on a simplified model of the world, while understandable from a cognitive perspective, led to significant strategic errors.

C. A Deeper Dive into the Sunk-Cost Fallacy and Cognitive Dissonance in Vietnam

While a purely rational actor operating under Expected Utility Theory would dispassionately abandon a failing strategy, the historical record of the Vietnam War demonstrates that policymakers were anything but dispassionate. Instead, they were deeply influenced by a powerful cognitive bias known as the sunk-cost fallacy and the related psychological phenomenon of cognitive dissonance. These biases created a self-reinforcing feedback loop that sustained U.S. involvement long after the initial strategic rationale had eroded. The costs already incurred—in lives, resources, and national prestige—became a primary reason to continue, not a cause for re-evaluation. This section will demonstrate how these psychological forces provided a more compelling explanation for the war's prolongation than any EUT-based model.

The sunk-cost fallacy is the tendency for individuals to continue a course of action because of the resources already invested, even when it is clear that the future returns do not justify the continued expenditure. In Vietnam, the "sunk costs" were astronomical. By the time Robert McNamara left the Department of Defense in early 1968, the United States had already committed over 500,000 troops, and the war was costing tens of billions of dollars annually. The human cost was even greater, with American casualties rising steadily [22]. A strict EUT calculation would require policymakers to ignore these past costs and only consider the expected utility of future actions. However, decision-makers did the opposite.

This is poignantly captured in McNamara's own reflections. As early as 1966, he began to privately harbor serious doubts about the war's unwinnability, yet he continued to publicly support and even advocate for escalation. His memoir, *In Retrospect*, reveals the internal conflict he faced, a classic example of cognitive dissonance—the mental discomfort experienced when holding two or more contradictory beliefs, ideas, or values. McNamara and his peers believed in their mission to prevent communist expansion, but they were simultaneously confronted with a steady stream of data suggesting that their strategy was failing. To reduce this dissonance, they often chose to reinterpret or dismiss contradictory evidence rather than change their core beliefs or, more importantly, their policy [22].

One of the most insidious ways the sunk-cost fallacy manifested was through the evolving rhetoric of the war's objectives. The initial, ambitious goal was to build a stable, non-communist South Vietnam. As this goal became increasingly unattainable, the stated rationale for the war began to shift. The new objective became less about "winning" and more about avoiding a humiliating defeat. This is a clear strategic consequence of the sunk-cost fallacy: the utility of a decision is no longer measured by its original objective but by its ability to justify past actions. As Leslie Gelb and Richard Betts documented in *The Irony of Vietnam*, policymakers consciously shifted from seeking victory to managing the "mess" they had created, focusing on achieving a "decent interval" between their withdrawal and the eventual fall of Saigon [11]. This was not a rational re-calculation of EUT, but an attempt to mitigate the political and psychological fallout of past investments.

The military-industrial complex and organizational incentives further exacerbated the sunk-cost dynamic. Each branch of the military had its own definition of success, and a full-scale withdrawal would have represented a significant defeat and a loss of prestige. For example, General William Westmoreland's strategy focused on a war of attrition, measured by "body counts" and large-scale conventional battles, which was a familiar and organizationally preferred method of warfare [21]. The logic was that if enough enemy combatants were killed, the U.S. would eventually "win." This simple heuristic, however, failed to account for the political will of the North Vietnamese or the nature of a protracted guerrilla war. When this strategy failed to produce victory, the military's response was not to question the strategy itself but to demand more resources and more troops, further deepening the U.S. investment and making a withdrawal even more psychologically difficult [4]. The organizational rationality of the military, therefore, was to double down on the failing strategy, which made sense from an internal, bureaucratic perspective but was sub-optimal from a national strategic one [16].

Another critical manifestation of the sunk-cost fallacy was the persistent use of optimistic forecasting despite a litany of contradictory evidence. The National Intelligence Council's estimates from the period, for example, reveal a pattern of both underestimating the enemy's resolve and overestimating the success of U.S. and South Vietnamese forces [26]. These forecasts were not simply analytical errors; they were often shaped by the need to justify past decisions. If policymakers had fully accepted the pessimistic intelligence, they would have been forced to confront the fact that their past choices had been mistakes. This would have triggered a severe bout of cognitive dissonance. To avoid this psychological discomfort, they prioritized optimistic assessments and dismissed or marginalized those who offered a more sober view of the war's progress, an excellent example of confirmation bias in action.

The tragic cycle of escalation provides a powerful illustration of this phenomenon. Each new deployment of troops or bombing campaign was justified not on its own merits, but by its necessity to protect the troops who were already there. As the number of American soldiers in Vietnam grew from tens of thousands to over half a million, the political and moral costs of a withdrawal became almost unbearable. As President Lyndon B. Johnson famously remarked, he felt trapped by the choices of his predecessors and his own. He feared that a withdrawal would not only be a personal and political defeat but a dishonor to the thousands of soldiers who had already died [11]. This emotional and political pressure, rooted in the ever-increasing sunk costs, led to a continuous pattern of escalation, even as private doubts about the war's viability grew. The rationality of continuing the war became about preserving credibility and justifying past sacrifices, not about achieving a future victory.

The case of Robert McNamara and the Pentagon Papers further solidifies this analysis. The internal documents revealed a pattern of private doubts and public misrepresentations about the war's progress [11]. McNamara and his team of analysts had begun to perform quantitative studies that showed the war was being lost, yet they continued to present a positive public face and advocate for continued commitment. This schism between their internal, data-driven understanding and their external, public actions is a textbook case of how cognitive dissonance can force a decision-maker to compartmentalize their beliefs to maintain a coherent self-image and public persona. They were trapped by their own

choices, and the only "rational" path they could see was to continue justifying the war to themselves and the public.

In essence, the Vietnam War demonstrates that the sunk-cost fallacy and cognitive dissonance are not minor analytical errors; they are fundamental psychological drivers of strategic decision-making. These biases provide a powerful alternative to the EUT framework, which is largely silent on such matters. While a rational actor would ignore past costs, policymakers in Vietnam were psychologically and politically unable to do so. The sheer scale of the investment—both human and financial—created a psychological anchor that made a rational, dispassionate retreat nearly impossible. Their actions, which appear irrational from a cold, calculative perspective, make perfect sense when viewed through the lens of a decision-maker trying to justify past sacrifices and avoid the profound psychological discomfort of admitting a costly mistake. The "rationality" of their decision-making was thus a function of managing their own internal beliefs and political standing, not a calculation of objective, forward-looking utility.

This analysis, therefore, moves beyond simply stating that EUT failed to explain the Vietnam War. It provides a specific, psychological mechanism for why it failed. The war was prolonged not out of a miscalculation of future probabilities, but out of a deeply human unwillingness to accept the consequences of past choices. This demonstrates the critical importance of integrating insights from cognitive psychology into the study of security and international relations to develop a more realistic and empirically grounded theory of strategic choice. The failure in Vietnam was, in large part, a failure of rationality itself, but a different kind of failure than EUT would predict. It was a failure rooted in the very human cognitive biases that an enriched model of rationality explicitly seeks to understand and explain.

DISCUSSION

A. Reconceptualizing Rationality

The findings from the Vietnam War case study underscore the limitations of using EUT as the sole framework for understanding strategic decision-making. The rigid assumptions of precise probabilities and stable utility functions are not merely theoretical abstractions; they are empirically flawed in practice. Our analysis of the war demonstrates that strategic choice is not the product of a simple maximization formula but a complex, multifaceted process informed by bounded rationality, subjective probability, and cognitive biases.

This does not mean that states or leaders are "irrational" in a chaotic sense. Rather, it suggests that the definition of rationality itself must be expanded. An action that appears irrational from a strict EUT perspective—such as continuing a failing war—may be perfectly "rational" when viewed through the lens of a decision-maker's subjective beliefs, their organizational imperatives, or their desire to avoid a politically costly humiliation [1, 23]. The goal is not to prove actors are irrational, but to enrich our understanding of what constitutes rationality in the real world. This enriched model provides a more robust and empirically grounded explanation for strategic behavior in security studies, helping to reconcile

the often-paradoxical actions of states with the theoretical models used to study them [19, 30]. It allows for a more nuanced analysis that can account for both the "why" and the "how" of strategic choice.

B. Policy Implications and Future Research

This reconceptualization of rationality has significant implications for both the academic study of security and the practice of foreign policy.

From a policy perspective, the most important lesson is to avoid an overreliance on rigid, quantitative models that can create a false sense of analytical certainty. Policymakers should be trained to recognize the limitations of probabilistic estimates and the inherent ambiguity of strategic situations [8, 10]. Instead of seeking precise numbers, they should focus on a more qualitative understanding of uncertainty and risk. The field of intelligence analysis, in particular, could benefit from a move away from vague qualitative language toward more structured and transparent methods for communicating uncertainty [6, 18]. Training in structured analytic techniques, such as war-gaming, red-teaming, and pre-mortem analysis, can help mitigate cognitive biases and challenge groupthink by explicitly forcing decision-makers to consider alternative scenarios and worst-case outcomes [24]. This approach fosters a more iterative and collaborative analytical process, which has been shown to improve forecasting accuracy [31]. The key is to foster a culture that encourages the explicit consideration of uncertainty and dissent, rather than one that privileges analytical overconfidence.

This study's primary limitation is its reliance on a single case study. While the Vietnam War is a powerful and illustrative example, future research should apply this enriched model to other historical and contemporary security challenges to test its generalizability. This could include examining crises where decision-makers had to choose between intervention and non-intervention, or analyzing the long-term strategic decisions of non-Western states with different cultural and organizational norms. Furthermore, future research could explore the specific mechanisms through which organizational culture and bureaucratic politics influence the formation of subjective probabilities. Finally, there is a need for more experimental work that examines how security professionals and policymakers actually communicate and interpret probabilistic information in a controlled setting [10]. These avenues will help to further refine and validate the enriched model proposed here.

CONCLUSION

This article has argued that a rigid reliance on Expected Utility Theory provides an incomplete and often misleading account of strategic decision-making in security studies. Through a critical examination of the Vietnam War, we have demonstrated that the core assumptions of EUT—precise probabilities and stable utility functions—are rarely met in practice. Instead, we have shown that strategic choices are the product of a more nuanced form of rationality, one that is bounded by cognitive limitations, shaped by subjective beliefs, and influenced by organizational and political pressures.

By reconceptualizing rationality to include insights from behavioral economics and organizational theory, we have developed an enriched framework that better explains why states sometimes persist in seemingly self-defeating policies. This perspective does not abandon the concept of rationality but redefines it, offering a more robust and empirically grounded lens for both academic analysis and policy practice. In an increasingly complex and uncertain world, the ability to understand and account for these cognitive and organizational realities is not a mere academic exercise but a practical necessity for improving strategic decision-making and avoiding costly policy failures.

REFERENCES

Achen, Christopher H. 2024. "Realism and Rationality." *Critical Review* 36(4). <https://doi.org/10.1080/08913811.2024.2440198>.

Betts, Richard K. 2000. "Is Strategy an Illusion?" *International Security* 25(2): 5-50.

Chang, Welton, Eva Chen, Barbara A. Mellers, and Philip E. Tetlock. 2016. "Developing Expert Political Judgment." *Judgment and Decision Making* 11(5): 509-526.

Connable, Ben. 2012. *Embracing the Fog of War: Assessment and Metrics in Counterinsurgency*. Santa Monica, CA: Rand.

De Finetti, Bruno. 1931. "Probabilism." English translation in *Erkenntnis* 1989(31): 169-223.

Dhami, Mandeep K. and David R. Mandel. 2021. "Words or Numbers? Communicating Probability in Intelligence Analysis." *American Psychologist* 76(3): 549-560.

Friedman, Jeffrey A. 2019. *War and Chance: Assessing Uncertainty in International Politics*. New York: Oxford University Press.

Friedman, Jeffrey A., Joshua D. Baker, Barbara A. Mellers, and Richard Zeckhauser. 2018. "The Value of Precision in Geopolitical Forecasting." *International Studies Quarterly* 62(2): 410-422.

Friedman, Jeffrey A., Jennifer S. Lerner, and Richard Zeckhauser. 2018. "Behavioral Consequences of Probabilistic Precision." *International Organization* 71(4): 803-826.

Friedman, Jeffrey A. and Richard Zeckhauser. 2019. "Analytic Confidence and Political Decision-Making: Theoretical Principles and Experimental Evidence from National Security Officials." *Political Psychology* 39(5): 1069-1086.

Gelb, Leslie with Richard K. Betts. 1979. *The Irony of Vietnam: The System Worked*. Washington: Brookings Institution.

Gillies, Donald. 2000. *Philosophical Theories of Probability*. London: Routledge.