Introduction

“One of the Things You Learn as President is that You’re Always Dealing with Probabilities”

In September 2010, the Central Intelligence Agency informed President Barack Obama of a “strong possibility” that Osama bin Laden was living in Abbottabad, Pakistan. Over the next several months, the CIA took extensive measures to learn whether or not Al Qaeda’s leader was inside the suspected compound. Though some of these measures produced suggestive evidence, none confirmed the identity of the reclusive man who slept on the building’s third floor. By April 2011, it was clear that if the United States were to strike the Abbottabad compound, this decision would have to be based on a probability assessment. President Obama thus asked his advisers to say more about what they thought a “strong possibility” entailed.1

Answers to the President’s question varied widely. The leader of the CIA’s bin Laden unit said there was a ninety-five percent chance that they had found their man. CIA Deputy Director Michael

Morell thought those chances were more like sixty percent. “Red Teams” assigned to make skeptical arguments offered figures as low as thirty or forty percent. Other views reportedly clustered around seventy or eighty percent. While accounts of this meeting vary, all of them stress that participants were uncomfortable making these estimates, and that they were at a loss for knowing how to resolve their disagreement. President Obama reportedly complained that these estimates provided “not more certainty but more confusion.” In a subsequent interview, he told a reporter that these judgments had “disguised uncertainty as opposed to actually providing you with more useful information.”

I know of no other case where such an important national security decision revolved around disagreements over quantifying probability estimates, and many other factors influenced President Obama’s choice to strike Abbottabad. But what makes this episode unusual is how directly the participants acknowledged their confusion, and not the substance of their disagreement itself. Virtually all major national security decisions take place under conditions of uncertainty, and any effort to elicit opinions on controversial issues will reveal different viewpoints. Reconciling this ambiguity is not some academic thought experiment: it is one of the most generalizable challenges of high-stakes decision making. If President Obama and his advisers struggled to gain traction on this subject, even when addressing the matter explicitly in one of their seminal decisions, this reveals a fundamental problem with a broad potential reach.

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The central problem with assessing probability in national security is that the most important judgments also tend to be the most subjective. What is the likelihood of suffering a major terrorist attack in the near future? How certain should intelligence officials have been that Saddam Hussein was pursuing weapons of mass destruction? How do we estimate the chances that a military operation will succeed? What is the probability that the United States and China will go to war within the next two decades or that North Korea will use its nuclear arsenal to harm another country? Though these kinds of questions play major roles in shaping national security policy, they almost never yield clear, “right” answers.

Though some people see probability assessment as an arcane topic, this is only because they do not approach the matter as explicitly as President Obama did when discussing the Abbottabad raid. It is essentially impossible to have an opinion about national security policy without engaging in some kind of probabilistic reasoning. Logically speaking, you cannot justify a costly action without believing that its chances of success are high enough to make expected benefits exceed expected costs. The question is thus not whether to assess probability when debating national security issues, but how to deal with this challenge when forming, debating, or critiquing policy choices.

National security officials are often reluctant to confront this challenge directly. In 1961, for instance, the Joint Chiefs of Staff met to evaluate the CIA’s plan for toppling Cuba’s government by landing a rebel army at the Bay of Pigs. The Joint Chiefs determined that the odds of this plan working were something like three-in-ten. But the Joint Chiefs also felt that it would be inappropriate to make this subjective judgment so explicit. Thus when Brigadier General David Gray wrote a report summarizing the group’s views, he stated only that the proposal had a “fair
chance of success.” While Gray meant to use the phrase “fair chance” in the same way that a letter grade of C reflects “fair performance,” President Kennedy interpreted “fair” as though it meant “fine,” thereby assuming that the Joint Chiefs supported the plan. After the invasion collapsed, Gray believed that his vague language had enabled a major strategic blunder, while Kennedy resented the Joint Chiefs for not giving him better warning.\(^3\)

Similar aversion to probabilistic reasoning is both common and deliberate in many areas of national security decision making. Chapter 1, for example, will show how U.S. military doctrine encourages commanders to identify courses of action that minimize risk and that offer the highest chances of success, but not necessarily to identify what those risks and chances are. Many intelligence agencies in the United States and other countries instruct analysts to leave probability assessments intentionally vague. From 2003 to 2011, the U.S. Department of Homeland Security assessed the risk of terrorism with an idiosyncratic, color-coded spectrum that may have done more to raise citizens’ levels of stress than their levels of preparation.\(^4\) Many scholars and pundits are

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\(^3\) Peter H. Wyden, *Bay of Pigs: The Untold Story* (New York: Simon and Schuster, 1979), pp. 88-90. Wyden writes that “in 1977, General Gray was still severely troubled about his failure to have insisted that figures be used. He felt that one of the key misunderstandings in the entire project was the misinterpretation of the word ‘fair’ as used by the Joint Chiefs. At the time, it never occurred to Gray that lack of figures might lead to a misunderstanding.”

just as reluctant to describe the uncertainty surrounding their judgments when debating national security in the public sphere. Phrases like “a fair chance of success” would quite often be more precise than the arguments that policy advocates use to justify placing lives and resources at risk.\(^5\)

As a practical matter, debates about proper methods for assessing probability shape the way that intelligence analysts report any key judgment, the way that military planners present any course of action, the way that decision makers discuss any high-stakes issue, and the way that scholars and pundits debate the merits of any national security policy. Yet this book is not a technical manual for policy analysis. Rather, the following chapters use pragmatic debates about probability assessment as a window into deeper concerns about the nature and limits of subjective judgment in national security decision making. How is it possible to draw coherent conclusions – let alone precise judgments – about something as complicated as the probability that a military operation will succeed? If these judgments are inherently subjective, then how can they be useful? To what extent can real people handle this challenge, particularly given the psychological and political

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constraints that surround high-stakes decisions? These are not just policy questions: they are social science questions, and they are the focus of this book.

The book’s main goal is to clarify the probabilistic foundations of national security policy, and I mean this in two, related ways. First, the book demonstrates that placing greater emphasis on probability assessment would bring wide-ranging improvements to national security discourse, both within government and throughout the broader public sphere. Second, the book attempts to resolve long-standing confusion about the logic, psychology, and politics of assessing uncertainty in international affairs. These practical and intellectual aims reinforce each other. When scholars, practitioners, and pundits leave their probabilistic reasoning vague (as with the Joint Chiefs’ assessment of the Bay of Pigs invasion) it can be difficult to know what their beliefs actually entail, and why they justify high-stakes decisions. At the same time, the difficulty that President Obama encountered in handling intelligence on Abbottabad shows that semantic clarity alone has limited value without a broader understanding of what makes probability assessments meaningful. If it is possible to make even minor improvements in this area, then that could bring major aggregate benefits – for as President Obama reflected when the bin Laden raid was over, “One of the things you learn as president is that you’re always dealing with probabilities.”

Skepticism of subjective probability

Skepticism about probability assessment in national security usually comes in either of two forms. The first, which I call agnosticism, is the notion that probabilistic judgments are too subjective and

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too unreliable to be useful when grappling with complex national security issues. As the political scientist Richard Betts puts it, this viewpoint suggests that “strategy is an illusion”: that even if we cannot form national security policy without making probabilistic assumptions, we are fooling ourselves to think these judgments provide much value. Dispiriting as this argument might be, it draws adherents well beyond the halls of academia. One of the most outspoken proponents of this view is the current U.S. Secretary of Defense, James Mattis, who argued in a 2008 essay that “it is not scientifically possible to accurately predict the outcome of [a military] action. To suggest otherwise runs contrary to historical experience and the nature of war.”

The agnostic view of probability assessment poses deep challenges for international relations scholarship. Every major theory of international relations advances some conception of how

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leaders react to uncertainty. If the agnostics are correct that national security analysts have no coherent basis for assessing this uncertainty, then there would also be no coherent way to connect international relations theories to real events. Any national security decision could plausibly be characterized as leaders pursuing what they perceived to be sufficiently-large chances of achieving sufficiently-important objectives. The concept of self-interest, and any theory of international behavior that depends on self-interest, would then be indeterminate. And since scholars could not rigorously prove that any decision departed from self-interest, this would render non-rational theories indeterminate, too. Scholars’ capacity to explain, critique, or praise national security decisions thus requires distinguishing probability assessments that are reasonable from those that are not. Chapters 2 and 3 explain how none of this can be done if the agnostics are correct.

A second skeptical view of probability assessment in national security, which I call rejectionism, holds that attempts to analyze the probabilistic foundations of national security policy are not just misguided, but actively counterproductive. Chapter 4, for example, describes how many scholars and practitioners worry that assessing probabilities can surround subjective judgments with illusions of rigor, giving the impression that analysts’ views are more scientific.

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than they really are. Chapter 5 then examines common claims about how making clear assessments of uncertainty exposes national security analysts to excessive criticism, thereby undermining their credibility and creating incentives for analysts to warp their judgments. These arguments lead many observers to oppose the idea of debating uncertainty in the way that President Obama and his advisers discussed the chances that Osama bin Laden was living in Abbottabad. The U.S. Defense Intelligence Agency’s official analytic standards thus currently state that “DIA does not condone the use of probability percentages in its products to portray likelihood.” The sentence is italicized in the original document, but the use of the verb “condone” by itself conveys the scorn – even moral opprobrium – that a major intelligence agency directs towards the notion that its analysts should concern themselves with making clear probability assessments.

The rejectionists’ view poses special challenges to the “behavioral revolution” in international relations scholarship. In recent decades, scholars have identified a broad range of cognitive biases that shape national security decisions. This research has shown that leaders’ perceptions can be

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distorted by prior assumptions and misleading analogies,\textsuperscript{14} that their policy evaluations are often skewed by emotions or overconfidence,\textsuperscript{15} and that they consistently neglect key elements of uncertainty when evaluating costly tradeoffs.\textsuperscript{16} One reason why this scholarship is significant is because it indicates that if public officials analyzed high-stakes decisions in clearer and more structured ways, then it would be possible to improve the quality of national security decisions.\textsuperscript{17} Yet the rejectionists suggest that attempts to impose clarity and structure on probabilistic reasoning

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\textsuperscript{16} For example, Keren Yarhi-Milo, \textit{Knowing the Adversary: Leaders, Intelligence, and Assessment of Intentions in International Relations} (Princeton, N.J.: Princeton University Press, 2014); Aaron Rapport, \textit{Waging War, Planning Peace: U.S. Noncombat Operations and Major Wars} (Ithaca, N.Y.: Cornell University Press, 2015).
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\textsuperscript{17} The psychologist Daniel Kahneman has famously referred to this distinction as between thinking “fast” (intuitive judgments guided by heuristics), and thinking “slow” (more deliberately, analytically-oriented reasoning). Kahneman, \textit{Thinking, Fast and Slow} (New York: FSG, 2011).
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can backfire, exchanging one set of biases for another in a manner that could actually make national security decisions worse.\textsuperscript{18}

It is easy to sympathize with these skeptical views. Over the past two decades, the most serious problems with U.S. foreign policy have revolved around the challenge of assessing uncertainty. Senior leaders underestimated the threat of foreign terrorist attacks prior to 2001, overestimated the chances that Saddam Hussein was pursuing weapons of mass destruction in 2003, and did not fully appreciate the risks of pursuing regime change in Afghanistan, Iraq, or Libya. Many of this generation’s most consequential events, such as the 2008 financial collapse, the Arab Spring, the rise of ISIS, Brexit, and the election of Donald Trump, were outcomes that experts either confidently predicted would not take place or failed to anticipate entirely. These experiences have led many observers to believe that it is better to keep policy discussions focused on the facts – that it is, at best, a waste of time to debate assessments of uncertainty that will often prove to be wrong.

Yet readers should tread cautiously with these views. There is an important difference between asking how good we are at assessing uncertainty on the whole, and determining how to address

\textsuperscript{18} For critical discussions of the relationship between analytic rigor and judgmental quality in foreign policy decision making, see Stanley A. Renshon and Deborah Welch Larson eds., Good Judgment in Foreign Policy (Lanham, Md.: Rowman and Littlefield, 2003). For arguments about how gut instincts and simple rules of thumb can sometimes outperform more complex analytic reasoning under uncertainty, see Gerd Gigerenzer, Adaptive Thinking: Rationality in the Real World (New York: Oxford University Press, 2000) and Roger Myers, Intuition (New Haven, Conn.: Yale University Press, 2002).
this subject as effectively as possible. It is hard to argue with the notion that scholars, practitioners, and pundits are less clairvoyant than we would like them to be. But that should only make it more important to avoid making that performance any worse than necessary. Thus while the Joint Chiefs of Staff might have had difficulty explaining exactly why they thought the Bay of Pigs operation had a thirty percent chance of success, their choice to leave this judgment vague was an unforced error that enabled a poor foreign policy decision. Similarly, if we accept that President Obama was not in a position to make an objectively-correct judgment about the chances that bin Laden was at Abbottabad, this only raises further questions about what it takes to make these judgments useful. If vagueness and confusion are the best that we can hope for when assessing probability, then that is important to know. But this is a claim that deserved to be tested, and not simply accepted at face value.

Throughout this book, we will see how even though skeptical views of probability assessment are widespread in security studies, there is relatively little existing research that submits these skeptical claims to rigorous scrutiny.\(^{19}\) Most existing scholarship on probability assessment in

international affairs revolves around statistical projections, game-theoretic models, or other algorithmic techniques for generating numeric probabilities. As a result of this research, scholars know a great deal about how to make these algorithms effective given the right questions and the right data. But algorithmic forecasting comprises a small fraction of the probability assessments that shape national security debates. When President Obama’s advisers thought about the chances that Osama bin Laden was living in Abbottabad, or when the Joint Chiefs of Staff analyzed the odds that the Bay of Pigs operation would succeed, their beliefs reflected case-specific, subjective judgments. When pundits debate policy proposals on television, or when citizens form their own views about controversial national security decisions, they are usually doing something very different than statistics or game theory. The fact that these judgments are so subjective and unstructured is exactly what makes many people skeptical of their value.

The main purpose of this book is to explain why this skepticism is misguided. By combining evidence gathered from survey experiments with analyses of cases including Vietnam, Iraq, and the search for Osama bin Laden, the book shows how national security analysts can make probability assessments that are theoretically coherent, empirically meaningful, and practically useful for structuring hard choices. Nothing in this book suggests that probability assessment should be easy or uncontroversial when evaluating complex national security decisions. But that is different from saying that these discussions are intractable or that we are better off avoiding the

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challenge. In this sense, the book offers a fundamentally optimistic message: the reason to be concerned with existing approaches to probability assessment is not just because they indicate vagueness or confusion in their own right, but because it is genuinely possible to do better.

**Chapter outline**

Chapter 1 sets the stage for this discussion by describing how scholars, practitioners, and pundits often debate probability assessments in a manner that is too vague to support sound decision making. The issue here is not just that national security analysts tend to express probability imprecisely but that, in many cases, they hardly grapple with the important probabilities at all, particularly by analyzing which policies offer the best prospects of success or by debating whether actions are necessary to achieve their objectives, without directly assessing the chances that high-stakes decisions will actually work. Chapter 2 explores the theoretical foundations of probability assessment, explaining why national security analysts always possess a firm theoretical basis for estimating subjective probabilities in clear and structured ways. Chapter 3 then demonstrates that real people can implement these ideas. By analyzing a database containing nearly one million geopolitical forecasts, Chapter 3 shows that national security analysts can reliably parse their probability assessments with numeric precision, even when dealing with unique, subjective issues. Together, Chapters 1-3 show that the theoretical and empirical foundations for assessing probability in national security affairs are stronger than what the conventional wisdom allows.

Next, the book considers the argument that even if national security analysts could make their probability assessments more meaningful in principle, doing so would have unacceptable consequences in practice. Chapter 4 explores the psychology of probability assessment, presenting
a series of experiments involving more than six hundred national security professionals. These experiments show that small differences in probability assessments consistently shape the way that national security officials evaluate high-stakes decisions,\textsuperscript{21} while refuting common concerns about how this kind of analysis creates misleading illusions of rigor. Chapter 5 then examines the politics of probability assessment, combining historical analyses of perceived intelligence failures with a nationally-representative survey of public opinion to demonstrate that vague assessments of uncertainty may actually expose national security analysts to more criticism than they prevent. These chapters suggest that the rejectionists’ view of subjective probability rests on a series of misconceptions: for example, conflating the fact that probability assessment is uncomfortable with the idea that it is harmful, or assuming that if criticism directed towards national security analysts can be unfair, then this criticism must also distort those analysts’ incentives. In showing that these arguments are both conceptually and empirically unsound, these chapters push back against long-standing cynicism about the nature and limits of probability assessment in national security.

\textsuperscript{21} One irony of these findings, which I discuss in Chapter 4, is that the national security officials who participated in these experiments often insisted that this kind of information would not be relevant to their decisions, even as the experimental data unambiguously demonstrated that fine-grained changes in probability assessments influenced their views. The notion that decision makers may not always be aware of how they arrive at their own beliefs is one of the central motivations for conducting experimental research on political psychology. Yet unlike many areas of political psychology which show how decision makers’ views are susceptible to unconscious biases, my experiments indicate that national security officials are more sophisticated than they give themselves credit for when handling subjective probabilities.
The book’s last two chapters provide a closer analysis of what it takes to make probability assessments useful for decision making. Chapter 6 shows how decision makers can use subjective probability assessments to structure difficult choices, even when they face additional uncertainty about how to estimate the costs and benefits that national security decisions entail. This kind of reasoning is especially important in situations where leaders cannot observe strategic progress directly, which is one of the main difficulties in evaluating military operations, economic sanctions, and other national security policies that play out over extended periods of time. In this context, I explain why clear probabilistic reasoning is not only helpful, but also logically necessary in order to understand when decision makers would be better off changing course as opposed to doubling down on their existing strategies. Chapter 7 concludes by exploring practical opportunities for improving the quality of probabilistic reasoning in national security debates. The chapter explains, in particular, how multiple advocacy can play an important role in pressing proponents of major decisions to justify the probabilistic foundations of their arguments. In this respect, the goal of improving probability assessment in national security decision making is not just an issue for government officials, but that it is also a matter of how scholars, journalists, and pundits can raise the standards of public discourse.

**Methods and approach**

If presidents are “always dealing with probabilities,” then how can there be so much confusion about how to handle this subject? And if the topic is so important, then why have other scholars not written a book like this one already?
One potential answer to these questions is that studying the probabilistic foundations of national security requires combining disciplinary approaches that scholars tend to pursue separately. Understanding what subjective probability assessments mean and how they can be used to structure national security decisions (Chapters 2 and 6) requires adapting general principles from decision theory to the specific problems of security studies, and revising theoretical frameworks that international relations scholars normally use to model rational choice. Understanding the extent to which real people can employ these concepts in practice (Chapter 3 and 4) requires studying the psychological dimensions of national security analysis and decision making. Understanding how the prospect of criticism shapes national security analysts’ incentives (Chapter 5) requires merging insights from political science and organizational management. In this sense, no one academic discipline is well-suited to addressing the full range of claims that skeptics direct towards probability assessment in national security.

There are good reasons why scholars tend to specialize in these disciplines, and the book’s eclectic approach involves an inevitable tradeoff of depth for breadth. Yet it is important to address these topics together and not in isolation. As the previous section explained, part of the challenge in making probability assessments meaningful is that well-intentioned efforts to mitigate one set of problems could plausibly backfire by amplifying others. Addressing these concerns requires taking a comprehensive view of the logic, psychology, and politics of probabilistic reasoning. To my knowledge, this book is the first attempt to do so.

A second reason why scholars and practitioners lack consensus on how to deal with subjective probability is that this topic is notoriously difficult to study empirically. Probability is an abstract concept that no one can observe directly. Since analysts and decision makers tend to be vague when discussing probability, it is usually hard to say what their probability assessments actually
mean. And even when analysts make those assessments explicit, they can still be difficult to evaluate. For instance, if you say that an event has a thirty percent chance of taking place and then it happens, how can we tell the difference between getting it wrong and being unlucky? We will see in Chapters 3 through 5 how addressing empirical controversies about the nature and limits of probabilistic reasoning requires gathering large volumes of well-structured data. Most areas of national security do not lend themselves to this kind of data collection. Scholars have thus tended to treat skepticism of probability assessment in national security as a philosophical matter, better-suited to epistemological debates than to empirical analysis.

In recent years, however, social scientists have developed new methods to study probabilistic reasoning, and national security organizations have become increasingly receptive to supporting empirical research on this subject. Chapter 3’s analysis of the value of precision in probability assessment would not have been possible without the U.S. Intelligence Community’s decision to sponsor the collection of nearly one million geopolitical forecasts. This unprecedented effort has given scholars insight into the nature and limits of probability assessment in ways that were all but unthinkable a decade ago. Similarly, Chapter 4’s analysis of how national security decision makers respond to probability assessments depended on the support of the National War College, sponsorship from the U.S. Department of Homeland Security, and the willingness of more than six hundred national security professionals to participate in experimental research. Thus even if none of the following chapters represents the final word on its subject, one of the book’s main contributions is simply to demonstrate that it is possible to conduct rigorous empirical analysis of issues that many scholars and practitioners have previously considered intractable.

Another way in which this book departs from existing scholarship is that its motivations lie primarily in addressing normative questions about what probability assessments mean and how to
make them useful as opposed to addressing descriptive questions about how behavior varies across cases. This is not to say that the book lacks conventional, causal arguments. Chapters 4 and 5, for example, each develop and test a series of hypotheses about how different kinds of probability assessments shape the politics and psychology of national security decision making. Yet the primary motivation behind the research presented in this book is to understand how scholars, practitioners, and pundits can make their probability assessments as meaningful as possible, and not to explain why they currently approach this subject in problematic ways.

The main reason why I chose to organize my research in this manner is that skeptics are already transparent as to why they mistrust probabilistic reasoning. For decades, these skeptics have argued that subjective probability assessments are theoretically incoherent, empirically meaningless, psychologically disruptive, politically harmful, or practically useless for making national security decisions. With a large volume of published work describing each of these viewpoints, there is limited room for scholars to add much value towards understanding why so many people are uncomfortable analyzing the probabilistic foundations of national security policy. What we don’t currently know is the extent to which those objections are sound. I will show throughout the book that this is an area where social science tools can help to advance debates that have broad implications for the theory and practice of security studies. By and large, I argue that existing scholarship presents an overly cynical picture of the nature and limits of probability assessment in national security, and that scholars, practitioners, and pundits often underrate their own ability to address this challenge.
Key concepts and connections to other fields

Since probability is an abstract concept, it is important to define some key terms up front. One important distinction is between probability and confidence. *Probability* indicates the chances that a statement is true. *Confidence* describes the extent to which an analyst believes that he or she possesses a sound basis for assessing uncertainty. For example, a coin flip has a fifty percent probability of coming up heads, and most people would have high confidence in making that estimate. But when you discuss the outcome of an election that you have not been following closely, you might say that a candidate’s chances of success are fifty-fifty simply because you have no idea. In that case you would still offer a probability estimate of fifty percent, but you would assign *low* confidence to this judgment.22

The importance of distinguishing between probability and confidence appears in several places throughout the book. Chapters 2 and 3 critique the common misconception that national security analysts cannot make clear probability assessments unless they possess high confidence in their judgments. I explain why that idea is both theoretically misguided (in the sense that national security analysts always have a coherent basis for assessing subjective probabilities however

22 Elsewhere, I have argued that “analytic confidence” comprises three distinct attributes of assessing uncertainty: the availability of reliable evidence supporting a judgment, the range of reasonable opinion surrounding that judgment, and the extent to which analysts expect their judgment to change in response to new information. Jeffrey A. Friedman and Richard Zeckhauser, “Analytic Confidence and Political Decision Making: Theoretical Principles and Experimental Evidence from National Security Professionals,” under revise-and-resubmit at *Political Psychology.*
precisely they like) and empirically false (as I show through large-scale data analysis that national security analysts can assess subjective probabilities with meaningful precision, even when dealing with unique issues where they could not possibly possess high confidence). Similarly, Chapter 4 discusses the concern that probability and confidence are psychologically indistinguishable. Though many scholars and practitioners worry that making clear probability assessments surrounds subjective judgments with illusions of rigor, I explain how this is really an argument for keeping assessments of probability and confidence explicit and distinct.

There is also a conceptual distinction between assessing probability versus assessing uncertainty, in that the former is just one component of the latter. Any decision under uncertainty requires assessing probability, as without some key element of a decision being probabilistic, there would be no uncertainty to deal with. But rigorous decision making under uncertainty requires tackling many challenges besides probability assessment, such as identifying the range of different outcomes than an action could cause, assigning costs and benefits to each of those outcomes, and judging the potential value of delaying action or gathering additional information. Defining costs and benefits may often be more challenging than estimating probabilities, since the national interest involves a broad spectrum of factors that are difficult to measure individually, let alone to weight and combine into some generalizable index of utility. Yet I am unaware of any serious scholar who argues that national security officials should deliberately avoid assessing their interests, or that it would be inappropriate to debate how much a major policy might cost. Thus

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while better probabilistic reasoning will not guarantee sound decisions, this is an area that generates special controversy.

Following a standard distinction in the decision sciences, I refer to individuals who are communicating probability assessments as *analysts* and individuals who are interpreting probability assessments as *decision makers*. These terms thus have relational meanings. For example, the Secretary of Defense is an analyst when reporting to the President and a decision maker when managing issues that are under his or her control. It is important to note that when I use the term “national security analysts,” I am referring not just to government officials but also to any scholars, pundits, journalists, or other observers who participate in public discourse.

Finally, while this book focuses on probability assessment in national security (and while most of its examples are drawn from U.S. national security policy, in particular), its main themes are relevant to nearly any area of high-stakes decision making. Debates about the value of probabilistic reasoning appear in any domain of public policy, and indeed throughout daily life. For example, medical decisions require assessing uncertainty surrounding contentious diagnoses or treatment options. Yet physicians, like national security analysts, can be reluctant to describe this uncertainty directly when speaking with their patients.  

unfavorable outcomes. Some critics find this practice to be absurd and potentially counterproductive.25

In one of the most salient examples of how probabilistic reasoning shapes civil society, the U.S. criminal justice system reaches verdicts by asking jurors to determine whether the probability of a defendant’s guilt lies “beyond a reasonable doubt.” Yet judges, juries, and attorneys hold strikingly divergent views of what this standard means. Some of the ways that “beyond a reasonable doubt” has been described in court include “60 percent,” “kind of like 75 percent,” “somewhere between the 75 and 90 yard line on a 100-yard-long football field,” and “a 1,000 piece puzzle with sixty pieces missing.”26 One survey asking federal judges to quantify the “beyond a reasonable doubt” standard produced answers that had a minimum of fifty percent, a maximum of one hundred percent, an average of ninety percent, and a standard deviation of eight percentage points.27 A related survey of jurors found several real juries in which a majority of members believed that a


seventy percent probability of guilt lay beyond a reasonable doubt.\textsuperscript{28} These seemingly arbitrary interpretations of probability raise troubling concerns about the application of criminal justice. But as in the domain of national security, many legal scholars and practitioners question the value of addressing this subject more directly.

Empirical findings from one domain do not always translate neatly into others. Yet this book’s conceptual framework and empirical methodology can be extended to nearly any other discipline that involves decision making under uncertainty. And to the extent that national security analysis is typically understood to be particularly complex and subjective, this should represent a high degree of difficulty for improving the quality and rigor of probabilistic reasoning. This is another sense in which the book presents an optimistic message. To the extent that the following chapters push back against long-entrenched skepticism about the nature and limits of probability assessment in national security, this suggests that other disciplines might also benefit from revisiting their own conventional wisdom on this subject.