Chapter One

Introduction

The Greek historian Thucydides analyzed decisions about war and peace over two thousand years ago. People, he argued, were motivated by calculations of self-interest, but other factors mattered as well, factors like fear and honor, that were not quite the same as self-interest. If you asked a social scientist today what drives decisions about war, you would get the answer that people make decisions about the use of organized violence more or less in the same way that economists say people make economic decisions, that is, in a coherent, stable, and efficient manner. This book is an exploration of a more complicated understanding of human decision making. It does not reject the explanation of decision making offered by the economists, which is often a useful analytical tool. It does, however, argue that processes other than conscious calculation play a role in human decision making along with conscious calculation. Emotion, stress, and hormones such as testosterone are important players in human decision making. By understanding the role of these other cognitive mechanisms, we can often better specify the limits within which conscious, rational calculations are performed. We can also specify the ways in which human decision making may change as our bodily states change. This helps us understand why the behavior of decision makers may not be stable over time, though their behavior could be understood as rational at any one moment. These other nonconscious factors can enable rational decision making, but they do lead to decisions that we would not understand or predict if we did not take those factors into account.

The evidence for this argument comes from many sources. It includes data from college students who participate in psychological experiments. It includes data from people receiving medical treatment for mental disorders. In such cases, we must be very careful not to extrapolate directly from these findings to the behavior of leaders in the real world, who, after all, tend not to be college sophomores or brain-damaged. Yet those experiments and the data from the treatment of patients can help us understand the operations of the human mind. What happens when certain portions of the brain responsible for understanding human emotion, for example, are disabled? By answering this question, we can begin to see how the behavior of people who have not experienced brain damage may be affected by the operation of those portions of the brain. By un-

derstanding why nineteen-year-old men are different from average politicians, most noticeably with regard to their testosterone levels, we can begin to see how variations in testosterone levels can affect human decision making.

There will be a natural tendency to see the operation of these nonconscious cognitive mechanisms as producing "bad" decisions, while conscious calculations produce "good" decisions. While natural, this would be a mistake. To repeat, the nonconscious mechanisms often function in ways that make rational choice possible in complex settings. These nonconscious mechanisms exist because they played a positive role in human evolutionary history. For example, they make possible rapid decisions when there are severe limits on the amount of time available for deliberation. But they may lead to decisions that differ from what standard economic models would predict. As Daniel Kahneman and Amos Tversky demonstrated, people may overgeneralize from limited observations, impute characteristics to people on the assumption that they are representative of a group, and take more risks to avoid losses than to achieve gains.[1] This book will explore the ways in which emotional memories may affect rational decisions, how stress and distress may lead to depression and defeat, and how testosterone may affect the impulse to punish perceived challengers. All of these phenomenan could be judged, after the fact, to be "good" or "bad." The concern of this book, however, will simply be to understand how and why the decisions were made, without judging the outcomes. This issue will be explored, in particular, in chapter 2.

The argument of the book is, in its essence, reasonably simple. It includes biological issues, but it is not a biological determinist argument. Human beings have several mechanisms inside them that play a role in decision making. These multiple mechanisms exist as a result of our biological inheritance. Human beings are not exactly alike, and in a population of people there will be variations in their biological inheritance. These variations affect the mechanisms involved in making decisions about social problems, including war. These biological factors and the way in which they vary from person to person can affect the political behavior of states. But there is a social or organizational component to the argument as well. The behavior of states will depend on the nature of the social institutions that empower or weaken the influence of individuals with certain inherited ways of making decisions. The impact of the biological mechanisms analyzed in this book depends on the social settings within which people make decisions, social settings that are, in part, the result of human choice. In short, this book tries to make the case that there is a biological argument that Thucydides was right, that fear and honor play a role in human politics along with calculations of interest,

but also that the other issues he analyzed, such as the nature of the political systems present in the ancient Greek world, matter as well.

Making that case takes some effort. This book uses the current scientific understanding of human nature, along with an understanding of social institutions, to explain human cognition as it is relevant to the issues of war and peace. Since the terms "human nature" and "cognition" are used in a variety of ways, they should be defined. In this book, cognition will mean the way in which information is selected, stored, recalled, and used, consciously or unconsciously, for decision making. Human nature will refer to the aspects of human cognition that are affected by biological inheritance, as those inherited factors are shaped by human interaction with the environment. This book argues that the two are linked. There are inherited parts of the brain and the endocrine system that function along with the parts of the brain that do perform conscious calculations. They affect rational calculation, and can facilitate rational calculation, but they can also push us toward decisions that are different from the ones we would make on the basis of conscious calculation alone. Indeed, it will be shown that conscious calculations by themselves may be insufficient to lead people to a decision, and other factors are important because they make possible rational choices in complex environments. Yet those other factors do complicate our internal decision-making processes. It is because of the coexistence of these other mechanisms, along with conscious calculation, that Thomas Schelling was correct when he stated that human behavior must be understood as the interaction between at least two conflicting selves within each person.[2]

The rest of this book is an elaboration of these ideas.

It helps to begin by looking at human nature and cognition in general, or the biologically affected ways of processing information that most people have in common. The biological sciences now give us a more detailed picture of how the human brain operates. While we do not have anything close to a complete understanding of human cognition, important elements of it are now better understood. For example, we know that the neocortex, the part of the human brain that is proportionally much larger than that found in any other animal, and which is responsible for conscious thought, does not treat all data equally. It is more sensitive to some kinds of data derived from sensory perceptions. In ways that can be reliably and empirically demonstrated, and for which evolutionary psychology provides plausible explanations, the neocortex is provided with, or preferentially selects, certain kinds of data. Certain memories, notably those formed at times of emotional arousal, and certain kinds of current data, notably the data associated with the expression of emotion in faces and voices, are more salient when we consciously and unconsciously consider what we should do. This selection of

data is not done consciously, but it does shape conscious thought. The data selected for use by the human brain is not necessarily the selection of data that would lead to the choices that an economist would regard as optimal. For example, new information may not be given as much weight as an economist would think it should, if the new information conflicts with memories that have emotional associations.

The neocortex then processes that data within certain parameters, or constraints. Those constraints are not consciously chosen and may or may not be optimal in ways that economists would recognize. For example, rational decision making involves thinking about the future consequences of current actions. The act of considering the consequences of our actions before making a decision is a function performed by the neocortex. But *how far* into the future should we think? Should I care a great deal about the consequences of my actions ten years from now, or should I let the future take care of itself? In more technical language, what is the nature of our time horizons? How much do we discount costs and benefits that arrive sometime after our actions? These time horizons are not something that we always choose consciously. Our time horizons can be affected by human nature, as well as conscious decisions. Both human nature acting unconsciously and conscious calculation can affect what we consciously decide to do. By better understanding the biology of human cognition, we can better specify how people make decisions rationally, by specifying the biological mechanisms that supply the data needed for decision making and specifying the parameters, such as time horizons, within which decisions are rationally made.

To be more specific, there are parts of the human brain involved in decision making that are distinct from the neocortex. These are sometimes referred to as the evolutionary older parts of the brain, because they are also found in nonhuman animals. For example, the amygdala and the hippocampus, working together with portions of the endocrine system, react to information in ways that shape the decision making done by the neocortex. But there are also parts of the brain that perform an independent decision-making role, separately from the neocortex. When I am hungry and I see a doughnut, I may eat it, not because I consciously calculate that I should, but because something other than conscious calculations has decided that I will eat it. This form of decision making is not the same as conscious decision making and can affect social interactions. If I am challenged by my subordinate, I may lash out and punish that subordinate "without thinking," and in ways that may not be what I would, in calmer moments, refer to as being in my best interests. If I am subjected to prolonged stimulation from the environment that I cannot control, my stress response and endocrine system will respond in a way that will eventually create a state of mind equivalent to depression.

While depressed, I will make decisions that will be different from the decisions I will make when not depressed. At any particular moment in time, my biological state will affect my decision making. If you are aware of my immediate biological state, my decisions will be comprehensible, but my behavior will not be stable over time. My decisions may not be rational in the sense that they are not stable: the same information will lead to different decisions at different times.

In short, the human brain is not easily reducible to a unified, rational calculating machine. It has parts that support conscious calculation, parts that shape conscious calculation, but also parts that can run counter to conscious calculation. Because these characteristics of the human brain are to some extent determined by our heredity, they are resistant to changes that are motivated by conscious choice. I cannot decide, for example, not to be depressed. I can try not to be affected by traumatic memories, but I may not succeed. We are not unitary rational actors, though we can try, sometimes successfully, to make ourselves behave as if we were. Because certain decision-making mechanisms can be dominant at some times but not at others, we do not always make decisions the same way. This means that we may not display what is at the core of the economic model of human decision making, that is, consistent and ordered preferences that are stable over time. The nonconscious elements of decision making can and do change over time in ways that we cannot consciously control, and this can lead to inconsistencies in our behavior. For a variety of reasons, at some times we will behave as if we want A, and at others, we will behave as if we want not-A. Human beings have been known to want to have their cake and eat it too, or, in the case of international politics, to want peace, for example, but also want to lash out at challengers who hurt us.

Though there is much about human cognition that is shared by all people, human beings are not identical. Natural selection can operate only on a population that has variations, and human beings display variations in their inherited decision-making mechanisms. As a result, it is important to understand the way different people process information differently, because of their differing hereditary factors. With regard to many cognitive factors, people are not all the same. All people have some measure of intelligence, for example, but intelligence varies across individuals in ways that are affected by genetic inheritance, though we can argue about how big a factor genetic inheritance is compared with other factors.[3] Biological variations in cognition go beyond intelligence. A teenage boy reacts to a challenge from a peer in a way that is different from the reaction of a middle-aged woman. More subtle but important differences exist among mature adults, with regard to their sensitivity to status challenges, time horizons, or susceptibility to depression. The abil-

ity to specify the ways in which different people make decisions differently enables us to deal with one of the longstanding objections to the use of the results of experimental psychology to explain real-world political behavior. The objection is obvious: people who participate in lab experiments may not be like the people who are the heads of governments. In fact, they are very likely to be different. But we can now begin to understand this heterogeneity, and so distinguish and identify people with different cognitive profiles.

Up to this point, the emphasis has been on individuals and individual decision making, but individual human nature and the variations among individuals in their natures cannot, by themselves, explain the behavior of groups of humans. There may well be differences in individual cognitive profiles, but political decisions are seldom made and executed by single individuals. It may be the case that human nature affects human cognition, and that individuals are different from each other, but how do we go from that to an explanation of the behavior of governments? The argument of this book is that different social settings or institutions do not always randomly select people and give them political power. Instead, they may preferentially select people with particular cognitive profiles for positions of responsibility and then situate them in social environments that reinforce the decision-making tendencies that they have as individuals. To give one example discussed at length in chapter 5, turbulent political environments full of near-term dangers make it easier for people with near-term time horizons to rise to political power, and for them to gain tyrannical power. Once in a position of absolute power, such individuals will exist in a social environment in which their individual cognitive profiles will be of considerable political importance, and their individual predisposition to act in ways affected by near-term calculations will be reinforced by the social setting in which they exist. A different political system will select and empower a different kind of person. The institutions associated with oligarchic politics may select for people sensitive to social status and put those people together in an environment that tends to focus and magnify their status challenges to each other, reinforcing their predisposition to engage in challenge-response types of status politics. In other group settings, the stress-induced depression experienced by one individual will create behavior that others can observe, and which can trigger fear and depression in them. On the other hand, one can also specify social institutions that will tend to dampen or neutralize the effects of individual cognitive predispositions before they are translated into group behavior. Checks and balances are meant, among other things, to prevent individual tendencies to "act in the heat of the moment" from becoming actual. So the variations in human nature relevant to cognition will be important only when social conditions reinforce them.

Rationality and Nonrationality

This book is part of the debate about whether human actions reflect rational choice, so it is necessary to make clear what is meant by rationality. References to the concept of economic rationality have been made, but, to be explicit, rationality in this book will mean what economists mean by rationality: a microeconomic model of decision making that assumes not simply that people act purposefully, but that they have a stable, ordered, and consistent set of preferences, and that they have a stable way of making choices about how to use scarce resources in a manner that gives them the most utility from a given expenditure of resources. Rationality does not simply mean purposeful behavior or actions that are associated with goals. People are not rational in the economic sense if they want something and the opposite of that thing at the same time, or if they want different things at different moments in time, or if they use all their resources to get the most of their first choice while ignoring opportunities to get a lot of their second choice cheaply. People are not rational if, under one set of circumstances, they use information to make one decision and then later use the same information to make an entirely different decision. Economists define rationality in this way so that it can be used to generate specific, testable propositions about how actors will behave. An actor who makes purposeful decisions but makes them differently at different times, or who simultaneously wants contradictory things, is not an actor whose actions can be modeled or predicted, however familiar such individuals may be in real life.

The economic definition of rationality was a major improvement on the looser use of rationality, which looks at a decision and then reasons backward from the behavior to a set of goals. This kind of analysis then concludes that the actor was acting "rationally" to achieve his or her purposes. Hitler invaded the Soviet Union. Was this rational? It is possible to selectively focus on facts that Hitler might have known, and to so show retrospectively that his calculation of the costs and benefits of his possible actions must have led him rationally to decide to invade the Soviet Union. This way of analyzing the past has intuitive appeal, but it also has major problems. Suppose Hitler had not invaded the Soviet Union. We would then find facts to show why his decision not to invade was also "rational." A definition of rationality that explains a decision and its opposite is not useful. The economic definition of rationality is not loose. It is a tremendously powerful analytic tool in conditions in which its basic assumptions hold.

People often do make rational decisions, very often about economic issues. People almost always want to pay less for a particular refrigerator than more. But there are conditions in which the preferences of people

are not stable and consistent. There are conditions in which their view of the future varies, or their use of information varies. In some circumstances, when confronting strong and basic human desires for food, sex, and safety, people often do want something and its opposite. They may want to lose weight and eat cake, or fight for their country but also not risk being killed. They may want to make money, but they may also want to punish a rival even though punishing the challenger does not increase their prosperity. They may calculate that their prospects for success are good at one time, but if they are depressed they may look at the same facts and decide that their prospects for success are low. These familiar kinds of inconsistent decision making can affect politics and, I will argue, are grounded in human nature.

Coming to Terms with Human Nature

Any effort to incorporate an understanding of human nature into our explanations of politics will be difficult and controversial. Why should it even be attempted? The short answer is that it cannot be avoided, and never has been. All theories of human politics have started, and must start, by talking about human nature. The question is not whether political analysis should investigate the subject of human nature, but whether one should use the best available information about human nature when analyzing politics. Limits on the available scientific evidence about human nature, of course, have not inhibited debates about politics based on alternative understandings of human nature. For example, Thomas Hobbes argued that men, by nature, were both inquisitive and fearful. They sought the causes of what they observed and invented invisible causes of events that had no visible explanations. They imagined the causes of things that harmed them and so became anxious and fearful about the sources of injury that they could not see. As a result, priests, whose domain was the unseen world, were powerful political figures, and their influence had to be radically circumscribed if there was to be a single sovereign, and domestic peace, in any political community.[4] From a terse characterization of human nature proceeded much of the political program of Hobbes. Rousseau, in contrast, argued that men, again by nature, were not naturally fearful, but predisposed to compare themselves, first to animals, and then to each other. Initially dispersed, they would be brought together by chance, and the propensity to make comparisons would then lead them to demand respect and appreciation; this was enough to launch a process of social envy and competition that would lead to human social misery.[5] Ultimately, men would have to be forced to be free, that is, they would have to be compelled to behave in

ways that enabled them to escape the consequences of the human natures that they had inherited, according to Rousseau.

John Locke, who is in many ways the author who most influenced American political science, also wrote about human nature. In the field of human cognition, he is perhaps best known for his argument that the minds of people are blank slates, without any innate principles inscribed on them. While he did make this argument, the work, *An Essay Concerning Human Understanding*, is in fact a broader effort to say what the human mind was capable of doing, given the way it was, by nature, and what the implications were for human politics. Human beings, Locke noted, had a particular kind of mind and operated with a particular set of sensory organs, but other kinds of human minds were imaginable, with different kinds of senses. But given human beings the way they were, there were certain kinds of things they could never know and should, therefore, stop fighting about, most notably, all religious issues not resolvable by reason. Human nature also was such that people were driven by uneasiness and desires that resulted from the absence of some positive or negative good (the absence of pain, for example). But humans were not mechanical creatures driven by their desires, because they could suspend their decisions about whether to satisfy a particular desire. They could choose the moment when they would decide. They could, therefore, choose to decide when certain desires were dominant, as opposed to others. From this understanding of human nature comes Locke's argument for free will. From free will comes Locke's most famous political argument, that governments are legitimate only when people consent to them. Consent would have no special value if humans did not have free will, if their choices were simply the inevitable consequence of external conditions.[6] Here, too, the central political conclusion followed from a specification of human nature.

Hobbes, Rousseau, Locke, and other political thinkers had views of human nature that were, at least in part, correct, but they derived their views on human nature from thought experiments, introspection, and, perhaps, their prior views on politics. This book tries to proceed from the data amassed by the last thirty years of work in the biological sciences. That data has, to this date, not come close to giving us a full and complete understanding of how human beings make decisions. At best, we have partial understandings of human cognition. Though this book tries to use the best available data, at points simplifications of and extrapolations from the scientific evidence will be made in order to arrive at propositions about political behavior. The fact that the book begins from scientific data does not mean that its conclusions have the status of scientific truths. The conclusions, however tentative and preliminary, will be the subject of political debate, as have earlier efforts to discuss human

nature and politics. An effort must be made to keep the debate constructive, and this can be hard to do when using data from the natural sciences to explain human behavior. The claim that a certain view of human nature is based on science has particular political force in our time. It is not subject to the common view that "you can have your view of human nature and I can have mine, and no one can say that one view is better than another." If something is said to be true, or possibly true, because it is based on the findings of modern science, we believe that we must take that claim seriously.

As a result, even modest efforts to advance tentative arguments using data from the natural sciences to explain human nature and political behavior immediately draw hostile reactions. If human nature is what we inherit, it is what we are given at birth. By the same token, it is not something we have chosen for ourselves, and so it is something that limits our freedom. The more substantive content we ascribe to human nature, the more we tend to limit the area of human choice and freedom. As a result, the effort to utilize a scientific understanding of human nature is controversial in ways that other efforts to understand human nature are not.

This problem has affected even the most apolitical biological scientists writing about human neuroscience. A prominent 1998 textbook on cognitive neuroscience began by summarizing past beliefs and theories about how the human mind processed information. It identified empiricism, the dominant strand in Anglo-Saxon psychology, before and after Freud, as the theory that all human ideas and knowledge came from our sensory experiences of the external world. Our minds were what our lives had made them. As far as our minds were concerned, we inherited very little. The textbook then noted, "This belief that environmental contingencies could explain all became welded into the very fabric of thought. After all, it reflected the American Dream. Anybody could become anything in the right environment."[7] The authors devoted the rest of the book to the demonstration that the empiricist view of the mind was not correct. The human mind has functions and structures that are the result of genetic inheritance, as well as its encounters with the environment. The authors realized, but did not dwell on, the fact that their scientific observations had political implications.

The fact that claims to scientific statements about human nature have this special status means that we must be particularly careful about how we make such statements. We should be careful not to claim too much. We must acknowledge, as all students of the brain now acknowledge, that the old debate between "nature" and "nurture" was improperly structured. Human cognition is the product of the interaction of inherited functions and structures with the environment. It is meaningless to talk about one in the absence of the other, and it is often difficult to sep-

arate the two, since the social environment can strengthen or weaken inherited mental predispositions, and inherited predispositions can shape the social environment. We can make some limited statements about certain inherited characteristics of the brain. But such statements about the inherited characteristics of the human brain could be true, or even obvious, and there might still remain important obstacles in the way of applying findings from the biological sciences to explanations of political behavior. We must acknowledge that we are nowhere near a comprehensive understanding of mental functions. One inherited mental predisposition might neutralize another, or reinforce it, depending on the circumstances. Hence, any statement about the impact of one particular brain function by itself may be misleading if all of the other brain functions, some of which are understood, most of which are not, are not taken into account.

If this is so, is it not simply premature to begin the effort to apply findings from these fields to the contentious world of international politics? Is this not particularly so since there are so many problems in taking findings from the laboratory and using them to explain social events in the real world? Do we not already have an adequate, if perhaps overly simple, model of human decision making, which assumes that human beings have preferences, use information rationally to evaluate the courses of action open to them, and choose the course of action that provides them most efficiently with what they want?

There can be no doubt that it is difficult to take what we know about the way individual human brains work and then use that understanding to explain how many human beings in complex social settings make political decisions. Political psychologists are more aware of these problems than most other people. Philip E. Tetlock catalogued many of the problems associated with using findings from psychology to explain international political events.[8] First, psychologists can explore whether, under specified laboratory conditions, people will display specified psychological characteristics. Even if psychologists cannot directly monitor everything that is going on inside the minds of people, they can run variations on the experiment in which they present subjects with different external conditions and then see if the subjects display different forms of psychological behavior. But we can never rerun political action in the real world, holding actors constant but varying conditions, so claims about the influence of psychological factors under certain conditions must always remain modest. Second, individuals may behave in ways that can be studied by psychologists in the laboratory, but groups of individuals will not behave the same way that isolated individuals behave. International relations is often about the behavior of groups of people. For those reasons, psychological studies of individual behavior, however interest-

ing, may be poor guides to the understanding of international relations. Third, many events could plausibly be explained by reference to psychological factors, but they could be explained by reference to nonpsychological factors as well, and, in truth, we will never know exactly how much influence any one particular factor may have had by itself, since real-world events are unique, complex interactions of many factors. Finally, psychological experiments are performed most often using American college sophomores, who are likely to be cognitively different, say, from Otto von Bismarck.[9] Even more problematic is the fact that the current understanding of human cognition often emerges from clinical studies of sick people who needed treatment and who may, therefore, be very unrepresentative of government leaders who have not checked into mental hospitals. And so on.

There are at least two kinds of responses that can be made to these serious criticisms about transferring findings from the biological sciences to the study of real-world politics. First, many of the criticisms of the relevance of findings from the psychological sciences to politics can be leveled with equal merit at the relevance of rationalist theories. If we cannot put Bismarck into a laboratory to see if he has certain psychological predispositions, neither can we examine him to prove that he was rational in the sense that economists use. All we have, when developing either rationalist or psychological arguments about real-world political behavior, are historically recorded words and actions. In developing any theories about why people did what they did, the answer is to use both the rationalist model and the biological model to generate competing predictions about real-world behavior, and then go back and look retrospectively to see how those predictions hold up. If we cannot rerun history to show that a leader who is alleged to be nonrational behaved in a way that was different from the way a rational leader would have behaved, neither can we rerun history to prove that leaders were behaving rationally.[10] A rational explanation of decision making must begin with some inferences about what the leader in question wants. Since we cannot see inside the minds of dead leaders, we must infer their preferences, after the fact, by observing what they did. This kind of reasoning can easily turn into tautological statements about the rationality of leaders. The alternative is to assume that a particular leader wanted what leaders in general want, and then see if a given leader did what other leaders would have done. But, just as in the case of the critique of psychological theories, we cannot rerun history. Was Hitler acting the way any rational German leader would have acted, or was Hitler's decision-making process different from that of other rational leaders? We cannot rerun the history of the Hitler period with another German leader in power to find out what a "rational German leader" would have done. At any given point in history, what

was the course of international political action that a rational actor would have adopted?

In the same way, the argument that factors other than psychological factors could have caused the observed behavior, even if that behavior was consistent with psychological theories, can be used to critique any explanation. The multiplicity of factors that could have affected the behavior we are studying, plus the complexity of real-world interactions among those factors, make it difficult to determine just what role each factor played in the real world, and how the outcome would have differed if one factor had changed, as Robert Jervis noted in his book, *Systems Effects*. It is hard to move from observations about the psychologically based behavior of individuals in isolation to the behavior of groups of people. But the same problem afflicts the rationalist approach. Arrow's theorem shows that groups of rational people will not display a consistent, transitive ordering of preferences, even if the individuals in the group are perfectly rational. Bargaining among rational actors can produce decisions that are not rational from the standpoint of the state. Of course, one can simply assume that governments behave the way an isolated rational actor would behave, but there is no theoretical reason to believe that this is in fact the case.

Extrapolation from studies of college sophomores and sick people to the behavior of national leaders is problematic essentially because we realize that people are different, and so we understand that we should not make conclusions about one kind of person by looking at very different groups of people. Political leaders may very well not be like the people studied in experiments. But if the argument is that people display heterogeneity of decision-making styles, why is it legitimate to assume that all leaders are equally rational and make decisions the same way? We can assume that only rational people will rise to the top of their government, but we can equally well assume that other kinds of people with different decision-making procedures will rise to the top of their government under different circumstances.

In the case of both rational choice explanations and explanations that make use of findings from the biological sciences, we should look to see whether the kind of decision-making process we see in controlled settings is also observable in real-world settings. In both rational choice explanations and cognitive explanations, we should avoid judging the outcomes of events and then reasoning back from outcomes assessed to be "good," after the fact, to rational decision-making processes, and from "bad" outcomes to irrational processes. We should characterize the processes themselves, and see whether those processes can be detected in the real world.

The assumption that states display economic rationality might be jus-

tified even if human brains behaved in the ways described by recent work in the neurosciences, if behavior conformed to predictions made on the basis of rationality—if states behaved "as if" they were making rational calculations. To make predictions about what rational decision making would be under a given set of circumstances, it is helpful to construct formal models, in which the effect of different factors on decisions can be clearly specified. The predicted outcomes of these models can then be empirically tested. The best-known work of this sort has been done by Bruce Bueno de Mesquita and David Lalman.[11] They found, using their own database, that states often went to war when their model, based on economic rationality, predicted they would. D. Scott Bennett and Allan C. Stam tried to replicate the finding that decisions to go to war empirically conformed to the predictions made by a model based on rational choice. Using data that referred to state interactions over longer periods of time and in regions other than Europe, Bennett and Stam found that in the largest set of cases, the model generated predictions that were "actually uncorrelated with the occurrence of mutually violent outcomes—not at all what the expected utility theory would predict. The situation with occurrence of war is even worse. The [model's] equilibrium of war is actually associated with the occurrence of peace." While behavior of states in the Middle East was often correctly predicted by the model, the behavior of Asian and African states was best predicted by taking the prediction of the model and then reversing it, because war occurred in those regions when the model predicted peace. In Europe, states that interacted with each other for thirty years did come to display rational behavior, but the reasons why they did not do so initially were not clear.[12] Bueno de Mesquita also used his model to predict the interaction between the People's Republic of China and Hong Kong,[13] but the prediction of the sharp and forceful suppression of Hong Kong autonomy by the PRC in the first years after the transfer of sovereignty has not been borne out by events in the real world.

These findings do not invalidate the rational choice model, which has some success in predicting behavior. One might take these findings and others and use them to make the rational choice model better. But why not take the same approach to models of human decision making based on the biological sciences? These models could be used to formulate hypotheses about what kind of behavior to expect in international relations, and then they could be tested, as best as possible given the limits on testing any social scientific propositions. They could become part of an ongoing project to refine our understanding of human behavior. Why would we not expect models based on the close empirical observation of human beings, which took into account the heterogeneity of human beings and the complexity of individual decision making, to provide a bet-

ter intellectual starting point than models that assumed that all people made decisions the same way, and that individuals have simple and consistent decision-making processes?

Moreover, the criticisms of the application of experimental psychology to international relations ought to encourage us to incorporate our understanding of the biological elements of cognition into our psychological explanations of international politics. Recent work in the neurosciences and experimental psychology is the result of well-structured, replicable, falsifiable empirical scientific work that does get us part of the way inside what has been the black box of human cognition. This helps us escape the dilemma of having to infer mental mechanisms from behavior and then use those mechanisms to explain behavior. Unlike Freudian psychoanalysis, the recent work makes specific statements, for example, about memory formation, that can be and have been tested by specifying the biochemical pathways that operate selectively to form and recall memories, and then chemically blocking those pathways to see if memory formation is inhibited in the predicted ways. If knowledge about the unconscious cognitive mechanisms of the human brain, for example, is available, why should we not make use of it, instead of assuming what may not be true? If political science claims to be a science commensurate with other sciences, it should incorporate the same findings about the same phenomena that the rest of the scientific world accepts. That means, on the other hand, speculation about evolutionary pathways that might have created cognitive mechanisms must be treated as more or less interesting speculation that has to be confirmed. If, however, evolutionary models of human development generate propositions about human cognition that can be and have been tested, they should also be accepted.

The second general response to the criticisms leveled above goes beyond stating that rationalist and psychological theories often suffer from common problems. More constructively, the biological sciences may be able to help some of the problems that were identified above, which afflicted both rationalist and psychological theories. There is the possibility that the biological approaches to human cognition may help fix exactly the problems that have been leveled at the earlier efforts to use findings from experimental psychology to explain real world politics. If the biological sciences offer some ways of identifying and characterizing cognitive mechanisms that operate under some specified environmental circumstances, they may help us deal with the fact that human beings differ in the way they process information, by specifying the observable, measurable markers of different cognitive profiles. If the biological sciences offer us some limited insights into the variations in human cognitive types, ought we not use them, precisely because the assumption that all people are equally rational, or not, is unwarranted? If the biological sciences give

us some understanding of human social behavior, how information is really exchanged in a group, or how fear develops and propagates in a group, for example, why should we not utilize this information?

In addition, standard models of rational decision making may be true but insufficiently specified to be useful, and the biological sciences may help us understand how to specify more precisely how people use information to make calculations to support their decisions. By being more specific and by looking inside the black box of cognition, we can begin to characterize the ways in which people may be cognitively different, and identify them in ways that are independent of their behavior. If the biological sciences can help us understand which kind of people have different cognitive profiles, under different circumstances, the cognitive sciences are not "overthrowing" rational choice, but filling in important blanks in the rational choice model. The cognitive sciences may have much to say about this subject and much to contribute, in general, to the improvement of our understanding of rational choice.

Puzzles and Human Nature

If you are interested in war, and begin the task of understanding human behavior in war by applying the standard model of rationality, you will find no end of puzzles. We have noted that a key assumption of models of rational choice is that people have stable preferences, and stable methods for making decisions: if they prefer A to B at one moment in time, they will prefer A to B later on. Yet it is one of the better-established findings in sociology that military organizations can routinely take groups of young people and change their preferences in relatively short periods of time. Armies recruit men and women who care very much about protecting their own lives, and who care nothing about each other in civilian life. They may even have been hostile to each other because they were members of groups that clashed in civilian life. Armies then put these young people through a training process such that they become willing to die for each other, even under circumstances where no superior officer can check up on their behavior and punish slackers. Thomas Hobbes was candid enough to admit that his model of human behavior that was based on the calculated avoidance of violent death could not account for the observable phenomenon of militaries, or, rather, that according to his theory, soldiers were justified in running away from battle. Yet they did not. What is going on? The rationalist account cannot give us an adequate explanation of one of the most basic facts about international relations, which is that states can get groups of people to die for each other.

There are more puzzles. Rational choice assumes that an individual has stable decision-making processes. Yet no one who has lived through such events would care to defend the proposition that people employ the same decision-making processes when they are safe, well fed, and have had enough sleep as they do when they are being shot at by an enemy force, or the survival of their country is at stake. Why is there this difference, and how does it affect the outcome of the decision-making process?

Rational choice models assume that people care about efficiently piling up the most of whatever it is that they want using a given amount of resources. They do not act, except under certain well-specified circumstances, as if they cared about how much they have compared with what other people have. Yet political leaders talk constantly about prestige and status in international relations. Is it just talk? Is such talk a mask for other goals? Or should we take heed of the fact that all primate communities form status hierarchies, and that status competition is a routinely observed characteristic of these communities? Might we not wonder if people who have unusually strong desires for social status might tend to rise to the top of social hierarchies, where they continue to be sensitive to status and prestige?

The decision to investigate the implications of the findings in the biological sciences for international relations would be justified simply by the availability of better information about human nature, but in the case of international relations, we have major outstanding puzzles that we have difficulty resolving using standard models of rational choice. This desire to do somewhat better in understanding these puzzles should lead us, at least, to look at the work being done in the biological sciences.

This book does not present a complete model of the mind. Such a model is not available, nor is it likely to be available for some time to come. With a complete model of the mind in hand, one could specify the cases where the predictions of economic rationality and the predictions of biologically affected decision making agreed, and where they disagreed. Then one could choose individual, real-world cases to see how biological factors functioned as, more or less, "independent variables." We could assess how much of real-world behavior was driven by "rational" factors, and how much by other factors. But we do not have this complete model of the human mind. Without such a complete model, one has to do something like what is done in this book, which is to focus on outstanding problems and apply, in an exploratory way, our limited understanding of aspects of human cognition. It may well be the case that subsequent work in the cognitive sciences will lead us to reconsider the arguments made in this book. But if we wait for a full and verified model of the human mind, we will wait a long time. While waiting we will be forced to resort to simplified models of decision making that we

know to be flawed, instead of trying to incorporate pieces of what may be part of the model of the human mind, as they become available.

The Structure of the Study

Several ideas inform each of the following four chapters. First, and most importantly, the book will explore the implications of the possibility that the human mind has content-specialized functions for processing data about the external world that are inherited, in addition to the ability to consciously process data in the cerebral cortex. Those content-specialized functions are the result of our evolutionary history, involve the endocrine system as well as the brain, and are decision-making mechanisms that both operate independently and interact with conscious decision-making processes.

The human mind is not a *tabula rasa*, a blank slate on which the environment operates to create a decision-making process. Rather, following the work in evolutionary psychology, the book treats the mind as an evolved organ, with functions that have emerged as a result of our evolutionary history, and which interact with the environment in certain prescribed ways. This assumption runs counter to the dominant model of individual cognition central to modern social science. Emile Durkheim set out this model early in the development of modern social science in his *Rules of the Sociological Method*, first published in 1895:

> Collective representations, emotions, and tendencies are caused not by certain states of the consciousnesses of the individuals, but by the conditions in which the social group, in its totality, is placed. . . . [I]individual natures are merely the indeterminate material that the social factor molds and transforms. Their contributions consist exclusively in very general attitudes, in vague and consequently plastic predispositions which, by themselves, if other agents did not intervene, could not take on the definite and complex forms which characterize social phenomena.[14]

The human brain, according to this model, labeled by John Tooby and Leda Cosmides the Standard Social Science Model (SSSM), is unformed at birth. In the words of cognitive psychology, the brain has no content-specialized functions. It records sensations produced by external stimuli and notes what those impressions are associated with. It acquires functions, expectations, fears, and desires more complicated than the simple human physical appetites as a result of its encounters with the environment. The human brain is, if not infinitely malleable, so malleable that radically different environments can induce radically different habits of thought and behavior. In the SSSM, the question of what produces the

social environment is answered by references to the social environment that preceded it, and so on back indefinitely. This begs the ultimate question of where social environments come from, but that question seemed sufficiently distant from operational questions as not to lead to major doubts in the SSSM. The SSSM is a model of the human brain as a very flexible, reprogrammable computer that learns in response to stimuli from the environment.

The major modern challenge to this model was first made by Noam Chomsky in 1957 in his book *Syntactic Structures*, and later in his more popular book *Language and Mind*.[15] He asked a very simple question. Given the infinite number of grammatical sentences possible in every human language, and given the brief and fragmentary exposure of children to sample sentences, how can children learn the rules of languages so easily in the short spans of time that we know to be sufficient for language acquisition? Why is it that children do not have to work their way through all of the possible meanings of any given verbal stimuli before learning what intentions lay behind the spoken words and sentences they hear? Language acquisition, which is rapid and easy in humans, is inexplicable if one assumes that the mind is a *tabula rasa*. Since, in fact, infants always and easily learn languages, Chomsky reasoned his way through to a view of all human language based on a universal grammar that all human beings share because it is not acquired from the environment but is built into their brains, and to an innate "Language Acquisition Device." People can learn languages because their brains do have content-specialized functions. They are built so as to be capable of giving only a certain set of interpretations to stimuli of a certain class. This view revolutionized and is now the dominant perspective in linguistics, though recent work has suggested that children learn different languages in different ways and respond to unconscious statistical analyses of what they have heard, perhaps without the need to assume a universal grammar or a specific language acquisition module.[16]

Did Chomsky's breakthrough have larger implications? Beginning in the 1970s, the view was developed that if the human mind has a built-in way of handling verbal stimuli, perhaps it has other innate cognitive structures to handle the equally complex and ambiguous stimuli it is constantly receiving. As developed by anthropologists, the question was raised, if these innate cognitive structures exist, where did they come from? The answer that emerged was that these structures emerged the same way that every other human structure emerged: through an evolutionary process that encoded evolutionary-valuable changes into our DNA. People do have brains with content-specialized functions in the way that they have other organs with certain specialized functions. Why might human brains have evolved with content-specific functions instead

of with a generalized form of intelligence, equally useful for solving a broad range of problems? The answer might lie in the question, what forced the early primates that preceded humans to get smarter? In the 1970s and 1980s, Nicholas Humphrey, Richard Byrne, and Andrew Whitten suggested that human intelligence developed to handle the problems of human social interaction in increasingly large groups. Human intelligence emerged when early humans who had more capacity for processing information from social settings did better for themselves and for their kin in obtaining mates and forming coalitions against social rivals. Human intelligence, and the inherited components of the human brain, therefore, might have emerged in ways that were marked by the social and sexual selection process that drove the evolution of the human brain.[17]

This controversial view has been advanced by a growing group of anthropologists. John Tooby and Leda Cosmides have been in the forefront of articulating it. They have advanced another model of the mind that stands in explicit contradiction to the SSSM. It is best simply to present their own summary of their position as given in their edited volume, *The Adapted Mind*:

> The central premise of *The Adapted Mind* is that there is a universal human nature, but that this universality exists at the level of evolved psychological mechanisms, not of expressed cultural behaviors. . . . A second premise is that that these evolved psychological mechanisms are adaptations, constructed by natural selection over evolutionary time. A third assumption made by most of the contributors is that the evolved structure of the human mind is adapted to the way of life of Pleistocene hunter-gatherers, and not necessarily to our modern circumstances.

Hence the kinds of human behavior we are most familiar with, which make up the recorded human history of the last three thousand years,

> are all the novel products of the last few thousand years. In contrast to this our ancestors spent the last two million years as Pleistocene hunter-gatherers, and, of course, several hundred million years before that as one kind of forager or another. . . . For that reason, it is unlikely that new complex designs . . . could evolve in so few generations. Therefore, it is improbable that our species evolved complex adaptations even to agriculture, let alone to post-industrial society.
>
> . . . the human mind evolved in response to the demands of a hunting and gathering way of life. Specifically, this means that in relating the design of mechanisms of the mind to the task demands posed by the world, "the world" means the Pleistocene world of hunter-gatherers. That is, in considering issues of functionality, behavioral scientists need to be familiar with how foraging

people lived. We cannot rely on intuitions honed by our everyday experiences in the modern world. Finally, it is important to recognize that behavior generated by mechanisms that are adaptations to an ancient way of life will not necessarily be adaptive in the modern world.[18]

What are the content-specialized functions of the brain that we inherited and that still structure our cognitive lives? Learning language is clearly one because it seems to be impossible for a general purpose processor to cope with the problems of ambiguous symbolic communication. For the same reason, it is argued that both the capacity for understanding that human facial expressions are the manifestation of specific internal mental states and the social skills employed in acquiring mates are also embodied in our brain.[19] There is experimental evidence that supports this position. We know, for example, that damage to certain areas of the brain does not disrupt the learning of mathematics, but it does prevent adults from understanding social signals that undamaged adults can reliably extract from photographs.[20] Charles Darwin first made the argument that human facial expressions are evolved mechanisms for reliably communicating the interior emotional state of individuals, rather than arbitrary symbols that can be given any meaning. Although scholars adhering to the SSSM have criticized Darwin's argument, more and more data compiled by skeptics of the Darwinian position has only tended to confirm the view, at least for a short list of primary human emotions and expressions.[21]

There are some children who do seem to have minds that work in ways that resemble the SSSM. They remember events and consciously and painstakingly correlate the events with what subsequently happens, making corrections for mistaken correlations that lead to unfortunate predictions. They can see physical objects moving around them, making noises, and putting food near them, but they do not understand that those objects are human beings with minds and intentions. They do not understand that certain movements of the roughly spherical object on top of the larger bifurcated moving objects are expressions on the faces of human beings, indicative of interior mental states. These children are autistic. Most people have brains that are constructed so as to be particularly sensitive to patterns of light and dark that look like human eyes and follow the direction of the gaze indicated by the position of human eyes. They are predisposed then to make the inference that the direction of the gaze is associated with an internal mental state, that people are interested in what they are looking at. Children who are not equipped by nature to make that leap can learn to associate certain observations with certain behavior that tends to follow it. Such people do operate by means of a brain that is a general purpose processor, and their social lives are

very difficult. They have to live in highly structured and simple social environments in order not to be confused. One autistic child who grew up to be a physical scientist commented that she stayed away from situations that might involve complex human behavior and kept and replayed in her head "videotapes" of human behavior so she could remember what kinds of behavior tended to lead to other behavior. She did not understand emotion. By repeated observation, she knew that some human behavior followed certain facial expressions. "I can tell if a human being is angry or if he is smiling."[22] This, it can be argued, is the pattern of human behavior associated with a brain that, for whatever reasons, lacks certain content-specialized innate functions. The capacity to infer from observations of a human being that this is another person like myself, with intentions that may be beneficial or harmful to me, is an extraordinarily powerful capacity. It is probably present in chimpanzees as well as humans, though not in the other great apes.[23]

The existence of content-specialized mental functions may not always be highly localized in the brain, and we are far from understanding all of them, and how they relate to each other. In the following chapters, we will review in detail the work that analyzes how several of these mechanisms operate: how they are equipped by human nature to respond to certain external stimuli, how they are linked to the production of hormones and are sensitive to levels of hormones in the body, and so on, in ways that are not fully controlled by conscious thought. The general point, however, is not that human beings are automata, hard-wired to behave in preprogrammed ways to external stimuli, but rather that these inherited predispositions operate at the same time as conscious information processing and decision making. At times, those inherited mechanisms operate in ways that produce impulses contrary to the actions indicated by conscious thought, and, under specified conditions, they drive decisions, leading us to strike back at a challenger even when we "know" that this would be counterproductive, or to give in to attractive, short-term temptations that we "know" are not good for us in the long run, or to despair and surrender even though we "know" that there are chances for success. In other cases, these inherited mechanisms support conscious decision making by selectively recalling and presenting information such that unconscious mechanisms for information retrieval affect the conclusions reached by conscious calculation.

This list of examples suggests that mechanisms lead to error. The question would then arise, how could organisms that had prospered in evolutionary history have survived with such faulty hard-wired decision-making processes? The speculative response has two parts. First, it tends to be the case that these hard-wired mechanisms produce clear-cut decisions very quickly, even in complex and ambiguous settings in which the

conscious decision-making process would produce uncertain decisions after considerable delay. We can speculate that in human evolutionary history, the survival value of making some decision, any decision, and then action, as opposed to paralysis, was large and positive, although it may not be so today in the context of modern politics. Second, we can speculate that some human decision-making errors today are the result of the operation of mechanisms that evolved to solve problems very different from the problems we now actually encounter. As a result, these evolved mechanisms can now lead both to errors and to good decisions, depending on whether the structure of current problems resembles that for which we evolved content-specialized mental functions. Whether the evolutionary speculation is correct or not does not matter, because we can and should simply look for the presence or absence of observable mental mechanisms that incline us to behavior that is different from that indicated by conscious decision making, independently of whether the decision reached is "good" or "bad." If we focus on the processes, and not the outcome, we avoid the error of inferring a successful evolutionary process from "good" outcomes, or inferring a mismatch between our evolutionary heritage and current problems from "bad" outcomes.

The second major idea that the book explores is the proposition that although all human beings have inherited ways of using information about the world, there are variations across individuals in the extent to which these inherited mechanisms affect behavior. It is important to emphasize this because evolutionary theory has been interpreted to mean that a certain set of evolutionary conditions will lead to an "optimal" evolved type, or an optimal form of decision making, which completely displaces nonoptimal forms. The result is a cognitively homogenous population of humans. The general form of this argument is familiar from Kenneth Waltz's contention in his work, *A Theory of International Politics*, about how states in competition with each other would come to resemble each other or perish, and has been used to develop an argument about what kind of vision of the future, or time horizons, would be optimal for human beings under certain conditions.[24] This view, that competition produces homogeneity, is surely mistaken. Every species displays variations in its inherited characteristics. Evolution cannot occur without variations at the level of individuals that give them an advantage over other members of the species. Perfectly homogeneous populations optimized for one set of conditions would be very vulnerable to mass extinction if conditions changed. Mixed populations would be more likely to contain a variety of characteristics that were better able to respond to changing environments. Stephen Jay Gould has advanced the view that the evolutionary history we actually have observed is not the only evolutionary history that was compatible with the conditions that existed.

Evolutionary conditions were not so stringent as to make possible the emergence of one and only one population of species.[25] By the same logic, evolutionary history is not likely to have been so stringent as to produce total uniformity within species.

What might this mean? If there is a biological component that affects human decision-making behavior, and if it can be reliably measured, it should, in theory, be possible to identify the variations in human genetic coding that are associated with different, stable dimensions of personality. That is the theory. The practice has been much more problematic. There have been, for many years, studies that used comparisons of heterozygote (fraternal) and homozygote (identical) twins, as well as comparisons of child behavior within families, to measure the impact of variance in genetic inheritance on the variance of human behavior compared with the impact of environmental factors. Considerable debate and effort has been expended in developing better survey techniques for assessing the dimensions along which personality can vary.[26] Initially, personality was assessed by asking people to evaluate their own personality. Asking people about their own personality turned out to be full of risks, and determining the right words to accurately describe internal emotional states is very difficult. As a result, early "personality inventories" based on self-assessments were flawed, and made it difficult to search for possible genetic correlates of stable personality differences.[27] To this kind of difficulty had to be added the difficulties of studying human genetics. Progress has recently been made, but studies of human genetics are slow and hard. Conceptually, should we expect to find one personality type encoded on one gene? This approach, which has successfully identified the genetic basis of diseases such as Alzheimer's disease and some complex behavioral disorders such as schizophrenia, was given the label the One Gene, One Disorder (OGOD) approach. But after much work, it was determined that many human traits, including subtle variations in personality, were more properly understood as the result of a complex of multiple genes, not one of which is necessary or sufficient for the emergence of a personality characteristic.[28]

Work in this area of genetics and personality types has produced suggestive but inconclusive results. For example, a review of two independent studies published in 1996 summarized their findings as follows: "People differ greatly from one another in temperament—temperament being the dynamic organization of the psychobiological systems that regulate automatic responses to emotional stimuli. Individual differences in temperament are known to be moderately heritable and stable throughout life regardless of culture or ethnicity. . . . Now, two groups . . . have identified a specific genetic locus that contributes to variation in a human personality trait." Variants of D4 dopamine receptor gene were found to

account for about 10 percent of genetic variation in the trait labeled Novelty Seeking, defined as "more exploratory, thrill-seeking, and excitable" versus "more deliberate, rigid, orderly."[29]

Subsequent studies have challenged and supported the particular findings of these two studies in roughly equal numbers.[30] The central point, that there is variation in the genetic inheritance of individuals that affects their decision making, remains a major hypothesis for investigation. With regard to some of the issues examined in this book, the propositions that are explored are the extent to which there are variations across individuals in their sensitivity to short- and long-term consequences of their actions, motivation to punish challengers, and inclination to give up when presented with uncontrollable circumstances.

Third, this book tries to understand the social mechanisms and institutions that select individuals of a particular character out of the heterogeneous pool of people available and give them political power. Not all human types rise to the top. It may be the case that different human types rise to the top in different societies. We know, for example, that some human societies in their internal organization are more oriented toward social status than others. We refer to them as more or less egalitarian. The people who rise to the top in those societies are sensitive to status, or status displays, and may remain so even if in some environments their behavior does not continue to produce rewards for them, because their behavior is the outcome of a biological process that influences their character and a social process that gives power and can also take it away. Kevin McAleer has written a history of dueling in Germany at the end of the nineteenth century. These duels were not relatively harmless, as is sometimes assumed by authors who argue that dueling was a relatively low-cost way of achieving social advantages.[31] By the early twentieth century, duels in Germany were being fought with Browning or Luger automatic pistols with rifled barrels, and five exchanges of shots at fifteen paces or less. The intent of the duel was to measure bravery, not marksmanship, so the duels were set up to produce a fatal exchange. The men who participated in such duels were members of the German political-military elite and included such men as Alfred von Kiderlen-Wächter, who fought, successfully it need not be said, three duels and became secretary of state for foreign affairs in the Wilhelmine Empire.[32] Dueling was a mechanism for insuring that the men who controlled German foreign policy had a certain well-established character, and it may have been the case that this character was not simply the result of an environment shaping the character of individuals but the social institution selecting out certain individuals who had a fixed, biologically based disposition. This is the argument that Kenneth Waltz makes when explaining the differences in the personality types that rose to the top in the Tory Party in

the context of British parliamentary institutions and the personality type that rose to the top in the American presidential institution, though without the argument for a biological factor.[33]

But fourth, and finally, the inherited decision-making processes of individuals, even those who have been selected for political power, may not have anything to do with the political behavior of states engaged in international relations if the group or social setting in which they find themselves neutralizes or damps down the impact of the tendencies of those processes. We can easily think of situations in which people have deliberately constructed group settings that make it unlikely that individual impulses of one kind or another will turn into collective behavior. We know that people can get angry and make rash decisions, so we build cooling-off periods into discussions and negotiations. On the other hand, the environment or group setting in which individuals find themselves may reinforce or amplify the tendencies they have. A crowded, dark room will tend to turn the panic of one individual into group panic, for example. Because we cannot simply move from statements about the decision-making characteristics of one individual to the decisions taken by a group, we must try to specify the settings within which the decision-making characteristics of an individual will tend to create positive feedback loops that reinforce the tendencies of that individual. Timur Kuran, for example, has tried to specify the circumstances in which individual reversals of positions can lead to sudden group reversals.[34] In each of the following chapters, an effort will be made to specify the conditions under which individual cognitive behavior can affect group behavior.

These are the central arguments of this book. How can they be applied to particular issues? What follows is the effort to do so, with regard to emotion and memory, dominance and testosterone, distress, depression, and war termination, and time horizons and tyranny. In each of the following four chapters, emphasis will be placed not only on how the biological sciences may help us understand individual decision making, but on the nature of the social setting that must exist for these individual factors to affect group behavior. In each chapter, emphasis will be placed on explanations that differ from those produced by economic theories. This should not be taken as a statement that explanations based on economic rationality are never true, or do not coexist with noneconomic explanations. An effort is made in each chapter to specify the conditions under which the nonrationalist explanations might be important, but even in those cases, rational calculations almost surely were factors as well. I have emphasized the nonrational issues for the sake of exploring them, not to prove that people never display rational behavior. With these reservations in mind, let us begin.