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Emerson M. S. Niou, Peter C. Ordeshook and Gregory F. Rose

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CHAPTER 1

Introduction

Among the depressing features of international political studies is the small gain in explanatory power that has come from the large amount of work done in recent decades. Nothing seems to accumulate, not even criticism. Instead, the same sorts of summary and superficial criticisms are made over and over again, and the same sorts of errors are repeated.

Kenneth Waltz, *Theory of International Politics* (1979, p. 18)

Despite the attention of such intellectual giants as Spinoza, Rousseau, Kant, and Clausewitz, we know little more about international conflict today than was known to Thucydides four hundred years before Christ.

Bruce Bueno de Mesquita, *The War Trap* (1981, p. 2)

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Although the causes of international instability and conflict have been the object of intense scholarly concern, the events of our century are not inconsistent with the supposition that we have made little progress in identifying those causes, that, once identified, we have not adequately applied our research to the discovery of correctives, or that those causes have multiplied at a pace that exceeds our abilities of assimilation and analysis. Some scholars amass and analyze vast arrays of data on diplomatic exchanges, military expenditures, economic indicators, the formation of alliances, and the frequency and severity of wars; others apply the mathematics of decision and game theory with varying degrees of sophistication to the description of international relations processes; and still others reason through the meaning and application of concepts and words such as polarity, power, regime, deterrence, neocolonialism, and the balance of power. If this research has uncovered causes and correctives then, for one reason or another, the corresponding scholarly utterances have been less than compelling.

If we reflect upon the considerable literature on the causes of war, one of the chief difficulties is that, on the one hand, so many explanations are offered, we are predisposed to discount them all; on the other hand,

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since it is so easy to find counterexamples to any particular explanation, a great deal of baggage must be carried to ensure a universal understanding. Such difficulties warn us that true scientific explanation is not being achieved, and that rather than isolating a fundamental cause within a logically consistent theoretical framework, this research appears at best to uncover the varying circumstances sufficient to render conflict an understandable choice by key decision makers. Yet, insofar as uncovering fundamental cause is concerned – uncovering the laws that govern the interactions of people in international affairs and the circumstances under which such interactions yield instability and overt conflict – we are no more likely to infer such cause by the massaging of vast data arrays or from a careful compilation and analysis of historical events than we are to infer the physics of falling objects by observing the flight of leaves from trees.

We are not so brazen to suppose that the research we report here resolves all issues. Nevertheless, our goals are immodest: to identify the conditions under which international systems are stable as well as the conditions under which they are unstable, the circumstances in which this instability implies conflict, the objectives that that conflict is intended to serve, and the steps we might take in designing domestic and international institutions to avoid such conflict. Our approach is analytical and abstract, and consists of identifying a structure that is fundamental to all international political processes. Our aim is to formalize the ideas offered by the realist view, in which the dominant force directing international processes is the national pursuit of a single-minded self-interest in an otherwise anarchic system. To achieve this formalization, we make a great many compromises with reality, and the theory we offer is but a preliminary step toward a comprehensive, deductive theory. The measure of this volume's success will be the extent to which other researchers follow our lead by refining our model with alternative and more general assumptions.

The necessity for and choice of a paradigm

So substantial is the literature on international politics and the causes of war, we should believe that it already contains many of the essential components for a general understanding of our subject. If, as Einstein asserted, “The whole of science is nothing more than the refinement of everyday thinking,” then it is unreasonable to suppose that the scholarship of centuries is not replete with insights into the fundamental mechanics of international systems. Nevertheless, we must ask why this scholarship has not formed a generally accepted body of theory with corresponding prescriptions for averting or anticipating wars. Our hypothesis is that this

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research too often occurs without reference to any basic paradigm of explanation, or to paradigms that are only dimly perceived, poorly specified, and that do not lend themselves to the rigorous derivation of conclusions so that we can see clearly the underlying premises.

Without an explicitly defined and formally organized conceptual scheme identifying general concepts and the relationships of these concepts to the observed world, an empirical literature, no matter how well-informed and scholarly, can be little more than an unsystematic mass of insights, conjectures, and stylized facts. Ideas, however insightful, reduce to ill-defined constructs held together more by linguistic structure than by a well-understood theory, and understanding and explanation devolve more on familiarity with jargon than on scientific law and generality. A paradigm, or (more properly) a theory based on a paradigm, ensures that our insights and suppositions accumulate, that they can be tested for their generality, and that they can be remembered as part of a coherent structure (Kuhn 1970). Hence, achieving this volume's goal requires that we operate with an explicit paradigm as a guide to our reasoning.

A paradigm, however, must do more than merely guide reasoning; it must also organize it in a rigorously deductive way. Human affairs are complex processes, certainly more complex than the situation confronting a natural scientist or engineer who attempts to understand the laws governing airfoils or fluid-flow thermodynamics. Indeed, developing a theory of international processes may entail confronting an even greater complexity than that which confronts us in natural science, which underscores our greater need for theory. Hence, it is essential that we employ a paradigm that permits us to collect our insights in such a way as to ascertain whether seemingly distinct phenomena can be thought of as manifestations of some more general process or whether our intuition requires a fundamental reinterpretation of reality.

Our paradigm is that of rational action and methodological individualism, where causal explanation stems from the supposition that all events, save those we attribute to the probabilistic whims of nature, follow from the actions of people pursuing their goals in a world constrained by limited resources, innovative skill, and the actions of others. Explanation, in turn, derives from models in which predicted actions are the only actions that follow logically from hypothesized goals and constraints or that can otherwise be sustained by those goals as equilibria. The mathematics of logical connections – the mechanism we use to ascertain the premises required to sustain our conclusions – are provided by decision and game theory, from which we must recover the appropriate representation of these connections for the substantive task at hand.

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The relevance of game theory

A fundamental part of our paradigm – the paradigm of rational choice – is the supposition that people’s preferences over alternative outcomes are “well-defined” and that these preferences can be represented by a measure we call *utility*. The concept of utility, though, occasions confusing the paradigm and rationality with a mode of decision making in which, after identifying their alternative actions and the likelihood of different consequences given each action, people choose the action that maximizes their utility or expected utility. This model is indeed part of the paradigm, but it is relevant in only highly specialized cases such as voting in mass elections or participating in markets as consumers. Indeed, we must reject the idea that explanation lies in the simple proposition that decision makers choose those actions that maximize their utility or expected utility. Our paradigm admits of more complexity than that, and Jervis (1976, p. 32) identifies the context of that complexity:

If he is to decide intelligently how to act, a person must predict how others will behave. If he seeks to influence them, he needs to estimate how they will react to the alternative policies he can adopt. Even if his actions do not affect theirs, he needs to know how they will act in order to tailor his actions accordingly.

Snidal (1986, p. 39), in turn, succinctly states the particular problem with which we must deal:

[Real international issues lead] . . . directly to a *strategic rationality* which incorporates the realization that pursuit of egoistic interest requires consideration of interactions of one state’s choices with other state’s choices. No state can choose its best strategy or attain its best outcome independent of the choices made by others . . . [and] the distinguishing trait of strategic rationality is that actors choose courses of action based on preferences and expectations of how others will behave.

International relations, if not most of politics, occurs in an environment of interactive decision making. In this environment, the actions of a single actor determine and are determined by the actions of others. This, of course, seems a trivial proposition, but it leads us to reject approaches that focus exclusively on the motives and beliefs of decision makers taken one at a time. We cannot accept as legitimate propositions such as “actor *i* chose *Y* because *i* preferred *Y* to *Z*” unless we are willing to impose some special assumptions. Because a voter’s effect on outcomes is so slight in mass elections, it is reasonable to hypothesize that voters ignore interactive effects in deciding how to cast their ballots – each voter ignores the possibility that others will alter their decisions as a function of what the voter in question decides. Hence, we assume that the environment of the voter’s decision, including the benefits associated with individual candidates and the competitiveness of the election, is taken as given from

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each voter's perspective. Similarly, in microeconomics, when modeling a consumer's decision, we assume that consumers take prices as given, since each consumer's effect on price is imperceptible. For virtually all other social processes, however, we cannot ignore the joint dependency of decisions, in which case our propositions must take the form "i chose Y because i believed that the other relevant actors, j, k, etc., would choose B, D, etc., and with these other choices, action Y maximizes i's utility (Y is i's best response to B, D, and so forth)."

Thus, an actor's utility calculations must summarize not merely preferences over outcomes and actions *simpliciter*, but must also take cognizance of the impact of the actions of others as constraints on that actor's ability to realize his or her objectives. This restatement might seem to represent only a modest revision, or perhaps even just a more complex restatement of the supposition that people act to maximize utility. However, notice that with this perspective we cannot fully explain final outcomes until we utter a parallel statement for person j (as well as for every other relevant decision maker) – that j chose B because, if i, k, etc. choose Y, D, etc., respectively, then B is j's best response. However, after formulating such sentences, we necessarily confront the problem of higher orders of thinking. If what i chooses is a function of what j, k, etc. choose, and if what j chooses is a function of what i, k, etc. choose, and so on, then how does each decision maker resolve the problem that all decisions are simultaneously determined – that what i does depends on what he believes j believes about him, and so forth? Game theory is the particular branch of decision theory that seeks to disentangle this simultaneity and to discover the logical choices of people in such interdependent contexts; thus, game theory becomes our primary analytic instrument.¹

Ours, of course, is not the first study that seeks to apply game theory to the study of international processes. Typically, though, these applications

¹ Although we refer to all interdependent decision-making situations as games, game theory identifies three alternative analytic representations of such situations, with each form corresponding to a different degree of abstraction. The first, a game in *extensive form*, is a representation of the situation that portrays the actions of decision makers, the timing of those actions, and the information of decision makers any time they must act. The key components of a game in extensive form is a list of decision makers, a list of decision nodes, a specification of the decision maker who must act at each node along with the alternatives available at that node, the information about previous choices that that actor possesses at each of his decision nodes, and a list of terminal nodes that specifies final outcomes and payoffs. The second representation, the *normal form*, requires a list of decision makers, a specification of the strategies of decision makers – a plan for how to play the extensive-form game that accommodates all possible contingencies – and an outcome function that takes the strategies of all decision makers and specifies a payoff for each decision maker. The final representation is a game in *characteristic function form*. This representation suppresses the notion of strategy, and focuses instead on the outcomes or

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take the form of demonstrating the parallelism between a specific process and a particular game, most notably the Prisoners' Dilemma and Chicken. In their most naive manifestation, we see sentences such as "let China be player 1 with the strategies a and b , . . .," and it is difficult to see how such an application can ever lead to a comprehensive theoretical understanding of international processes. Yet, we are not asserting that valuable insights cannot be gained from such an approach. Certainly, our understanding of the possibility of irrational collective action is illuminated by analyses of the Prisoners' Dilemma, the problems of coordination are revealed by Chicken, and recent studies of reputation and deterrence illuminate the profound significance of incomplete information. What we require, though, is a sufficiently general modeling effort that allows for elaboration, admits the possibility of incorporating these earlier studies as subparts, and provides the theoretical structure for an analysis of complete systems at the macro level.

The thought to keep in mind is that game theory is but a piece of mathematics and decision theory. Overzealous advocates and unrepentant critics may misinterpret its value and limitations, but game theory in fact offers only the logical connections between abstract concepts. It is not, by itself, a theory of social processes, so that taking a part of it and appending some story to that part does not constitute a theory any more than if we were to append some interpretation to the x 's and y 's in the equation $(x - y)(x + y) = x^2 - y^2$. Knowledge of game theory, however, heightens our sensitivity to the pervasiveness of interactive decision making in politics, and also provides the tools for thinking about such decision making in a logically coherent way.

Equilibria as causal explanations

Having accepted game theory as the principal analytic component of our paradigm, we are led to our third observation, namely, that concepts of equilibria for both noncooperative and cooperative games are the mechanisms whereby we generate causal explanations. The revision of the notion of utility maximization that requires consideration of best responses is based on the supposition that we can determine the optimal choices for

payoffs that can be assured by coordinated action on the part of subsets of decision makers (coalitions). The key elements of such games are again a list of relevant decision makers along with a specification of the "value" of each potential coalition. Ideally, we prefer to model all situations in extensive form, but this is not always possible, and the normal form and the characteristic function form offer representations that are more analytically tractable. For further elaboration of these distinctions and their formal representations, see, for example, Luce and Raiffa (1957), Shubik (1985), and Ordeshook (1986).

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people only if we determine all choices simultaneously. And it is the various notions of equilibria in game theory that form the basis for hypothesizing how people solve these simultaneous, interdependent decision problems. Briefly, an equilibrium for a game is a set of actions or outcomes that, given the goals of all decision makers and the structural constraints of the situation being modeled (an identification of relevant decision makers, the actions and information available to each decision maker, and a specification of the relationship between outcomes and joint actions), are the only ones that can endure.² Hence, we predict certain actions because these actions are in equilibrium. Correspondingly, the cause of a particular outcome is that it follows from actions in equilibrium.

This view of causation is important. Cause no longer resides in the mere correlation of events and circumstances or in their temporal ordering. Instead, to specify cause, we must specify the nature of individual goals, the parameters of structural constraints, and the corresponding equilibria. Hence, the attribution of cause to some particular event is moved away from a focus on the events that immediately preceded it; instead, our focus becomes the decision problem confronting all relevant decision makers and the outcomes that follow if those decision makers pursue the goals we assume for them. Insofar as peace and conflict are concerned, we explain one or the other as the consequence of the pursuit of individualistic goals in an environment in which everyone's actions and fates are interdependent; conflict or peace are merely the consequences of a set of individual choices in equilibrium as determined by individual goals and structural parameters. To illustrate, consider the hypothesis that wars are "caused" by a misperception of military capabilities, in particular, by the perceptions of two leaders that they can both win a conflict.³ In this instance,

² Game theory provides a variety of formal definitions of equilibria, so that the choice of a definition depends on the nature of the situation and the particular representation we use as a model. And although a part of contemporary theory seeks to remove the distinction, game theory traditionally divides its subject into two broad categories: noncooperative and cooperative game theory (or, in terms of their analytic representation, games in extensive or normal form versus games in characteristic function form). In noncooperative game theory, we suppose that players are unable to explicitly coordinate their decisions or that, if such coordination is possible, agreements are enforced by wholly endogenous considerations. The names of the equilibrium notions here that are especially relevant to our analysis are Nash equilibria and a refinement called subgame perfect equilibria. In the theory of cooperative games, on the other hand, we submerge the issue of enforcement, assume that coordination is possible, and look for those outcomes to which coordination might lead. In this instance, the relevant equilibrium notions are the core, the von Neumann-Morgenstern solution, the bargaining set, and the competitive solution. We will define each of these notions in this volume as we require them.

³ Although this hypothesis is suggested by Blainey's (1973) argument, it is not intended to be an accurate restatement of that argument (see our discussion in Section 2.3).

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however, misperception is merely a precondition, a part of the characterization of the game national leaders play. What remains to be shown (and what is implicit in the hypothesis) is that, given such misperception, one or both parties choosing war describes the equilibrium of that game.

This example also serves to illuminate a potential source of confusion in our terminology. Specifically, asserting that an international system is in equilibrium does not mean that there are no conflicts; the equilibrium choices of decision makers may be to war. Indeed, one of the implications of our paradigm is that with an appropriate conceptualization of the game decision makers play, all systems are in equilibrium at all times. It may be that a system is “in transition” – that wars move it from one type of equilibrium state to another – but because the transition path itself is the product of individual “rational” decisions, that path can be described as an equilibrium state. Our task, then, is not to ascertain whether anarchic international systems are in equilibrium; rather, it is to ascertain what kinds of equilibria are attainable under various circumstances. Throughout this book, then, we reserve the word “equilibrium” to denote the actions of decision makers that follow logically from their goals and the other relevant parameters of their environments. We use the word “stability” to describe the international systems in which conflicts of various sorts cannot arise.

We should also clarify another source of confusion regarding equilibria. The analysis that follows is in the realist mode to the extent that it focuses on “the struggle for power in an anarchic environment [where] states fend for themselves as they pursue their contradictory interests” (Snidal 1986, p. 39). It is a common mistake to believe, however, that such situations can occasion neither equilibrium nor cooperation. Riker (1980, p. 443), for example, argues that if systems match this conflictual view then equilibria are impossible, in which case “we cannot know much about the future at all.” However, in this instance Riker is adopting an especially narrow view of equilibria, one in which a specification of initial conditions determines uniquely the outcome that must prevail. The existence of such equilibria is rare, but the notion of an equilibrium does not refer to a single concept, and game theory offers a variety of definitions of equilibria. Some of these definitions are refinements of others, whereas some treat different classes of games. Although it is true that the conflictual circumstances with which realist thinking is concerned does not typically yield a simple variety of equilibria that occasions unique predictions, prediction in the form of a narrowing of possibilities is still possible.

With respect to the issue of cooperation in the conflictual politics envisioned by the realist school, Keohane correctly asserts that

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Cooperation takes place only in situations in which actors perceive that their policies are actually or potentially in conflict, not where there is harmony. Cooperation should not be viewed as the absence of conflict, but rather as a reaction to conflict or potential conflict. Without the specter of conflict, there is no need to cooperate (1984, p. 54).

The only qualification we need add is that cooperation is excluded if there are only two parties to the conflict and if the conflict is absolute – if the situation is zero sum. Barring this possibility, which we believe is actually rare in international politics, the various solution hypotheses of game theory (definitions of equilibrium) have as their objective predicting the form of cooperation that ensues.

Goals of decision makers

We do not suppose that peace requires that international leaders – those who control the destinies of sovereign states – be compelled to act one way or another by idealistic objectives. We cannot assume that a stable or an unstable international system emerges only if decision makers desire such a system. Scenarios such as the Prisoners' Dilemma tell us that even unanimous consent to some objective is no guarantee that people will choose actions that yield the desirable outcome (see, e.g., Olson 1965). Moreover, people may prefer stability to instability or peace to conflict, but these cannot be ultimate objectives. If we wish to assume that nations seek peace or conflict, we must show that such goals are the logical result of the operation of international political systems. Because we do not want to assume our result (that particular systems lead to peace and that others lead to conflict), we must begin with more fundamental objectives and derive the circumstances under which peace or conflict will prevail as the logical consequence of the relationship among states. Ultimate objectives, presumably, might include things such as maintaining one's domestic political power, securing economic benefits for oneself, or even ensuring one's personal survival. Stability (or instability) emerges, then, as a by-product of the pursuit of more fundamental individual objectives.

The same argument holds true for balance of power. If a balance of power as we define it later emerges in our analysis, it does so because it can be interpreted as satisfying some more basic objectives of decision makers. It may be true that leaders seek to maintain a balance and that a "balance of power lasts only so long as someone is ready to take risks to maintain it" (Wight 1973, p. 115), but only insofar as a balance serves specific purposes or is the logical result of the pursuit of those purposes. To postulate the pursuit of balance as a primitive objective is to assume what

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it is that we are trying to establish: that a balance can emerge in anarchic systems comprised of egoistic decision makers.

Domestic versus international politics

Theorizing about any phenomenon requires simplification, and in the area of international politics it is often tempting to render our analysis more tractable by ignoring domestic politics. Unfortunately, in specifying the goals of decision makers in international affairs and in identifying their relevant environment, we cannot ignore “mundane” domestic concerns. Certainly, people might be motivated to secure an honorable mention in history’s footnotes, and expressions of individual goals may take the form of the lofty rhetoric of international leadership and world peace. However, more commonly, such decision makers are motivated by more immediate concerns such as the establishment or maintenance of a domestic political advantage or, in the case of agents for multinational firms, the pursuit of economic advantage. We need only document those international conflicts that distract attention from domestic problems and thereby undermine domestic political opposition to see how domestic political constraints shape decisions in the international arena. This means that a theoretical dichotomy between international and domestic politics cannot be viable, or at least we must be prepared to formulate an analysis that allows for the eventual bridging of such a dichotomy.⁴

Rejection of the ultimate viability of such a dichotomy implies that we cannot suppose that conflict is caused by leaders who pursue the “wrong” goals or that peace is secured by more enlightened leaders. Although we cannot discount the influence of a single radical element, the logic of peace and conflict are to be found in the functioning of international systems as leaders react to each other, in the pursuit of their own goals, constrained by domestic politics. We cannot understand the emergence and influence of dominant figures without also exploring the domestic sources of their

⁴ This is particularly so if the classic grounds for theoretically distinguishing international from domestic politics lies in the “anarchy” of international politics in contradistinction to the “order” of domestic politics. As we argue shortly, the existence or nonexistence of well-defined political rule-systems is a function of the self-interest of political actors. The existence or nonexistence of explicit rule-systems is an endogenous variable, and thus we cannot appeal to the endogeneity of rules to distinguish international from domestic politics. If the international polity is anarchic and the domestic polity archic, it is not because international and domestic politics are categorically different things, but because actors – while pursuing essentially equivalent goals in both – generally find strategic advantage in elaborating explicit rule-systems domestically but do not find such advantage in the international arena. Indeed, a study of revolutions and coups d’etat suggests that, in a wide range of cases, domestic politics is as much a Hobbesian state of nature as anything in the international arena.