PART I

INTRODUCING PROBLEM REPRESENTATION

CHAPTER 1

Introduction

Donald A. Sylvan

> To agree on the problems we have with one another is the most important step in negotiations. We haven't yet agreed on problem definition with Syria. We have agreed on problem definition with Jordan. – Aviv Sharon, Director of Public Affairs, Ministry of Foreign Affairs, State of Israel, July 10, 1994

Aviv Sharon has expressed the importance of a critical variable in the understanding and explanation of foreign policy decision making. The manner in which a problem is defined and represented is crucial to the possible solution of that problem.

A great deal of scholarship in the area of foreign policy decision making concentrates on what Sylvan and Thorson (1992) term the *option selection* stage. Much rational-choice/game-theoretic work carefully illuminates the tradeoffs between alternative courses of action. The subject to be explained is usually the choice between specified options. That is also the subject to be explained by many more traditional, less mathematical studies of foreign policy decision making. In his classic work, Graham Allison (1971) tries to help the reader understand alternative ways of viewing the way in which ExCom (President Kennedy's Executive Committee during the Cuban missile crisis) decided between such specified options as blockade, air strike, and invasion.

"Problem Representation"

What these works do not do is ask the prior question, *How did the options get specified in the first place?* That is the subject of this volume, and we term it *problem representation*. How do the game theorist's options and utilities come about? Why were blockade, air strike, and invasion initially chosen as potential options? To answer these questions, we contend that one should

understand how the problem to which the options are a response has been represented. One should focus on both the determinants of that representation and its ramifications. This volume explores each of those issues.

In the academic community, Pennington and Hastie (1987), Voss, Wolfe, Lawrence, and Engle (1991), and Sylvan and Thorson (1992), have all discussed the importance of problem representation. Pennington and Hastie study jury deliberations and decision making and determine that a ''story model'' best accounts for the way in which jurors represent the problems they face. Voss defines problem representation in terms of understanding goals and constraints in a particular situation. Sylvan and Thorson argue that a person's ontology constrains the manner in which that person can represent a problem, and that option selection, in turn, follows from problem representation. Sylvan and Thorson illustrate their points with reference to decision making in the Cuban missile crisis.

Our research is based on one of the observations of Sylvan and Thorson. It is that the way in which foreign policy decision makers choose options can best be understood by first studying the way in which they represent the problem they see themselves as facing. The research we have undertaken and communicate in this volume explicates these themes in more detail, and we examine them in a variety of different foreign policy decision-making contexts.

The Context: Political Psychology and International Relations

The scholarship put forth in this volume lies at the intersection of political psychology and international relations. It is, therefore, appropriate to point out where the work here fits within the broader schools of thought in each of those two academic communities.

Political psychologists tend to study either elite or mass political behavior. In other words, either they tend to focus on those individuals who are influential in politics or to concentrate on understanding general attitudes and dispositions of a political populace. This volume clearly deals mostly with the first category, elite behavior. Within the study of elite political psychology, some scholars concentrate on roles while others concentrate on processes. In the former category, bureaucratic politics (e.g., Allison 1971) and political leadership (e.g., Hermann 1977) are good examples. Each concentrates on roles, with the former focusing on what bureaucrats have in common while the latter often differentiates between the styles of various leaders. Those whose works focus on political psychological processes, as opposed to roles, often study beliefs and the manner in which they are constructed. Studies as varied as Holsti (1976), Schank and Abelson (1977) and Simon (1985) fall in this category. Some in this grouping of scholarly works employ such

cognitively oriented constructs as scripts and schema. Others change the emphasis to socially influenced processes such as discourse (e.g., Sylvan, Majeski, and Milliken 1991). This volume is an attempt to contribute to the understanding of political psychology by studying elites and psychological processes. Most of the authors in this volume employ cognitively oriented constructs, with Rubino-Hallman diverging to employ the less cognitive, more socially constructivist discourse analytic approach.

Within the study of international relations, a predominant concentration is on systemic approaches. Many adopt a realist (e.g., Morgenthau 1956; Schweller 1996) or neo-realist (e.g., Waltz 1979) approach, with clear assumptions of rationality at the level of the nation-state. Even liberal and neoliberal institutionalists (e.g., Keohane 1986), who disagree with realism on most issues, also tend to focus on the international system and often to assume rationality at the nation-state level. The authors in this volume tend to diverge from the assumptions of both of these approaches and to follow more in the footsteps of Snyder, Bruck, and Sapin (1954). The emphasis is on decision making, with rationality of both individuals and nation-states an open question. Understanding problem representations employed in foreign policy decision making is one important way of getting at the empirical issue of when and under what circumstances individuals and nation-states act rationally.

Organization of the Volume

This volume is divided into four parts. Part I introduces the general topic of problem representation in foreign policy. Donald Sylvan's introductory chapter is followed by James Voss's explication of an information-processing approach to problem representation. An information-processing approach highlights the goal-oriented nature of much foreign policy decision making and helps us focus systematically on the role of problem representation in that process. Voss's chapter serves as a reference point for terminology that is employed in many of the following chapters.

Part II addresses overarching conceptual issues involved with studying problem representation. In Chapter 3, Charles Taber addresses the issue of how decision makers construct initial representations of problems facing them. Following on that concentration of initial representations, Robert Billings and Charles Hermann confront the issue of re-representation of problems in Chapter 4. The process of problem representation in groups is the backdrop for Chapter 5, as Ryan Beasley sets forth aggregation principles by which groups deal with initial problem representations of group members. In Chapter 6, Martha Cottam and Dorcas McCoy examine the relationship between images and problem representation.

Part III presents empirical analyses that involve problem representation. In Chapter 7, Helen Purkitt employs ''think aloud'' protocols to study South African politics. In Chapter 8, Donald Sylvan and Deborah Haddad employ laboratory experiments to test alternative models of problem representation of foreign policy situations, and they relate them to styles of reasoning. Michael Young uses a computational approach in Chapter 9 to analyze the foreign policy content of President Jimmy Carter's speeches. Katherine Gannon's Chapter 10 is the only chapter in which the content is domestic politics rather than foreign policy, as she garners insights on problem representation from Senate Judiciary Committee hearings. Silvana Rubino-Hallman uses computational tools and a discourse analytic perspective in Chapter 11, as she examines the workings of the Presidential Commission on Women in Combat. Gulf War speeches in the United States Senate are the focus of James Voss and his colleagues in Chapter 12. Marijke Breuning's Chapter 13 closes Part III as she employs both Parliamentary debates and analysis of government expenditures to study foreign assistance problem representations of three European nation-states.

Chapter 14 is the final chapter and the brief fourth part of the volume, wherein Donald Sylvan reflects on the study of problem representation by comparing the impact of alternative means of studying the concept.

Origins of this Volume

Having set forth some of the basic ideas that served as catalysts for this volume, as well as the outline of chapters to come, a brief explication of the genesis of this collaborative effort is in order. All of the contributors to this volume have been involved in a Research and Training Grant from the National Science Foundation.[1] That grant has focused on the role of cognition in collective political decision making and was funded for a five-year period that has now ended. The authors involved in this volume have presented their ideas and research to each other on numerous occasions throughout the life of the N.S.F. Research and Training Grant. This volume represents the revisions of those efforts after feedback from the group and the editors to each chapter author. Taken together, we hope our efforts help point the way toward a fruitful path of inquiry that will help us better understand both foreign policy decision making and political psychological processes.

Note

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CHAPTER 2

On the Representation of Problems: An Information-Processing Approach to Foreign Policy Decision Making

James F. Voss

Interactions such as conflict and cooperation that occur between states do not just happen. As noted even by Thucydides (1950), such interactions are regarded as a product of the interests and goals of one state and how such factors impact upon the interests and goals of another state. But a state's interests and goals are not simply given; instead, they are arrived at by the decision makers of that state. Thus, thought processes of the decision makers are critical to the interaction of states, such processes being a function of the person's beliefs and knowledge as well as the person's perceptions of the other states and their interests, goals, and motives. Hence, when a problem situation arises, individuals define the problem by developing a definition of the situation (Snyder, Bruck, and Sapin 1954, 1962) in which their own knowledge and beliefs play a major role. In other words, they develop a problem representation (Newell and Simon 1972). In a general sense, this position is constructivist in nature, that is, individuals are assumed to build models of their environment and act upon the contents of these models, solving problems and making decisions. The models, moreover, can be modified in relation to each person's experience.

In an epistemological sense, the extent to which such models "really" reflect a person's environment is virtually unknown because the representations are products of the individual's own knowledge, beliefs, and experiences and other genetically based or acquired characteristics. Indeed, an important means of evaluating a model is pragmatic – that is, whether it is consistent and helps the individual function in his or her environment. This neo-Kantian view is generally held in psychology, explicitly or implicitly, especially because humans are regarded not simply as passive recipients of environmental input but as active processors of incoming information, interpreting the input in relation to their knowledge, beliefs, attitudes, and motivation – indeed, even seeking and selecting the information in relation to these factors.

An important function of representation development is that with the help of a person's memorial capacity, that person is able to develop a sense of stability of the world that helps that person meet his or her needs and goals. Moreover, individuals acquire strategies and tactics that facilitate subsequent goal attainment. When we apply these notions to the domain of foreign policy decision making, individuals are assumed to build models of the world, with such representations being assumed to play a major role in mediating their actions and policy preferences and choices.

The Information-Processing Model of Problem Solving

The idea of problem representation employed in this chapter is based upon Newell and Simon's (1972) information-processing model of problem solving. Other theoretical views in which representational concepts play an important role are those involving mental models (Johnson-Laird 1983), discourse analysis (Shapiro, Bonham, and Heradstveit 1988), the operational code (Leites 1953; George 1969), cognitive mapping (Axelrod 1976), and a variety of conceptual developments in artificial intelligence (e.g., Nilsson 1980). Such efforts suggest that what is considered a representation can be difficult to define, a point discussed by Beasley (this volume), Rubino (this volume), and Young (this volume). Using the information-processing model, this chapter has the following goals: to describe this particular framework of problem representation, especially showing how the concept is of importance to foreign policy decision making; and to consider difficulties of this view of representation, difficulties that need to be overcome if the concept is to be used in studies of foreign policy designed to advance theory or improve practice.

Description of the Model

Although the issue of problem finding has received relatively little study (e.g., Mintzberg, Raisinghani, and Theoret 1976) and is beyond the scope of the present chapter, problems generally may be said to arise when an individual, group, or organization has a goal and that goal is not being obtained. Indeed, this idea, that a goal cannot be obtained because of some type of barrier, is the type of definition of a problem often found in the psychological literature (e.g., Bourne, Dominowski, Loftus, and Healy 1986).

When problems are identified, they are found to occur under particular environmental conditions, and the statement of the problem and the context or set of conditions in which the problem occurs is, in the information processing model, termed the *task environment* (Newell and Simon 1972). In proving a theorem of geometry, for example, there are ''Givens'' and a ''To

prove'' statement that define the problem. A problem of this type, moreover, is usually interpreted by geometry teachers and students in a similar way because they have acquired particular conventions about problem structures and solution processes in geometry.

The processing of the problem is assumed to take place in what is termed a *problem space*, which is in the individual's mental structure. The problem space consists of (1) all the possible *states* of the problem, including the initial state and the goal(s), (2) the *operators* that allow a person to move from one state to another, and (3) the constraints of the problem (Newell and Simon 1972).

With respect to problem states, the initial state consists of the ''givens'' of the problem, as stated and as elaborated upon by the solver, and the problem's goal state. Included also are all possible states that could intervene between the initial state and the goal state, including those that may not be appropriate with respect to the solving of the problem.

Operators constitute the means by which an individual moves from one problem state to the next. In a mathematical problem, operators, for example, may include adding and carrying numbers. In a geometry proof, an operator may be ''to find a theorem that is needed in this given situation.'' The type of operator used is thus a formation of the problem that is being considered.

Problem constraints are limitations imposed upon the solving of the particular problem. In proving a geometry theorem, for example, the solver may only be able to use theorems that have been proved. The problem goal itself is a constraint because it exerts a substantial constraining influence on the solution process. Moreover, as will be shown, constraints are often generated during the solving of the problem, especially in the case of ''ill-structured'' problems. Thus, problem solving, according to the information-processing model, consists of moving from state to state via use of operators; or within a spatial metaphor, the solver ''walks'' through the problem space (Newell and Simon 1972).

An additional question is what strategy an individual may use in walking through the problem space. One of the earliest computer programs of problem solving, the General Problem Solver (Reitman 1965), used means–ends analysis. This is a relatively common strategy in which an individual, in a given state, considers the goal and tries to determine how to take a step that places the solver closer to the goal. This strategy thus requires an evaluation component in order to determine whether via that particular step the solver is indeed progressing toward the solution. On the other hand, if the solver knows how to solve the problem, there is no need to use such a means–ends strategy, because the solver is able to ''work forward,'' going step-by-step to the solution (cf. Larkin, McDermott, Simon, and Simon 1980).

As to what constitutes a good problem solution for problems that are