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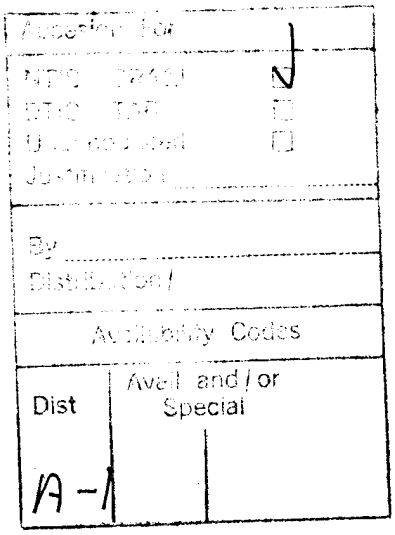
AN EXPERIMENTAL TEST OF THE POLIHEURISTIC THEORY OF FOREIGN POLICY DECISION MAKING USING MILITARY LEADERS

A Thesis

by

AMY ELIZABETH CARNES



Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

MASTER OF ARTS

August 1995

Major Subject: Political Science

AN EXPERIMENTAL TEST OF THE POLIHEURISTIC THEORY OF FOREIGN POLICY DECISION MAKING USING MILITARY LEADERS

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ABSTRACT

An Experimental Test of the Poliheuristic Theory of Foreign Policy Decision Making Using Military Leaders. (August 1995)

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Chair of Advisory Committee: Dr. Alex Mintz

This is a study in foreign policy decision making which assesses the impact of dynamic choice sets (where new alternatives appear during the decision process), on strategy selection and choice in international politics. The hypotheses tested involve how leaders change their decision making strategies during a foreign policy crisis depending on the limitations of time, information, and task complexity.

In order to test these hypotheses, a computer-based decision board platform was introduced to several groups of subjects including: (a) top ranking officers in the United States Air Force, (b) cadets from Texas A&M Corps of Cadets, and (c) undergraduate students from Texas A&M University. This study contributes to previous studies using the decision board platform (Mintz and Geva 1994; Mintz, Geva, and Redd 1994) in two ways. Unlike the other studies, subjects with various levels of experience in decision making participated in the experiment. Second, the inclusion of subjects, other than students, further increases the reliability of the Foreign Policy Decision Board as an experimental tool. The studies with the undergraduate students were previously reported in Mintz, Geva and Redd 1994.

The intention of this paper is to contrast experienced decision makers (military officers) with inexperienced decision makers (undergraduate students) and with a group that has received some institutionalized instruction in decision making, but may not be considered experienced (Corps Cadets). Its purpose is also to assess the impact of evolving choice sets on decision making strategies with these groups. The results showed that (1) experienced, semi-experienced, and inexperienced decision makers use a mixture of strategies when obtaining information to aid in the decision making process; (2) the structure of the choice set (whether it is static or dynamic) significantly influences the strategy selection and the choice among all types of decision makers; and (3) experienced and inexperienced decision makers differ in how they approach the decision making process. Overall, more experienced decision makers are less affected by the structure of the choice set than less experienced decision makers.

DEDICATED TO:

John
and
My Loving Family

ACKNOWLEDGMENTS

This study developed out of course work taken under my Committee Chairman, Dr. Alex Mintz. I would also like to thank Dr. Nehemia Geva as he spent many hours helping with the computer program and the data analysis. In addition, my Committee members, Dr. Allison Astorino-Courtois and Dr. James Burk were very helpful in assuring the completion of this project. Their instruction, guidance, and insights are very much appreciated. Dr. Hurley must also be given much of the credit for this project as she was wonderful in helping me to keep up on all the deadlines necessary to obtain a Master's Degree.

I also would like to thank the United States Air Force Academy and especially the Department of Political Science, as well as the Corps of Cadets at Texas A&M University in their efforts to provide subjects for this study.

Finally, I would like to thank my family and my fiance, John. Without their encouragement and support and most especially, the love of the Lord, this project would not have been possible.

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INTRODUCTION

The study of decision making and the processes behind how people make decisions is an important area of study in the field of political science. The input of information, the cognitive processes associated with the decision, and the consequences of decisions are some of the many factors which contribute to the final outcome of a decision. Understanding these processes is important because of the potential predictive power they hold for future decisions and the implications that may follow. In the field of political science, foreign policy decision making is of much interest. Recent crises such as the Persian Gulf War, the United States invasions of Panama and Grenada, and the attempted rescue of American hostages in Iran, are just a few examples of the many crisis situations in which national leaders must make decisions. The process according to which they make those decisions is often complex, yet an understanding of that process is becoming essential to the study of political science.

The processes by which one makes decisions are varied depending on the character of the decision maker, the constraints and circumstances of the situation as well as the environment in which the decision is made (Klein 1989). One prominent

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The journal model used for this thesis is the *American Political Science Review.*

author writing about psychology and the military notes "there are different ways to make decisions, analytical ways, and recognitional ways, and [that] we must understand the strengths and limits of both in order to improve military decision making" (Klein 1989: 57). Understanding the strategies used by decision makers of diverse backgrounds in an assortment of situations, is crucial to the complete discernment of foreign policy decision making. Generally, there have been two main approaches to foreign policy decision making in recent literature.

The seminal works on decision making come from von Neumann and Morgenstein (1947) using a classical or rational model and Herbert Simon (1957) who laid the foundation for the cybernetic approach. Because much of foreign policy decision making consists of efforts to evaluate the utility of alternative courses of action, these models of decision making have been theorized to explain the decision making process (George 1974). The rational model may be considered the most normative type of decision making (Maoz 1983), while the cybernetic model may account for many of the uncertainties involved with foreign policy decision making (Ostrom and Job 1986).

The rational model demands calculation of the alternatives by the decision maker. The necessary requirements for this type of calculation are: 1) information about the crisis; 2) substantive knowledge about the cause-and-effect relationships resulting from alternative courses of action; and 3) a method of applying the values of the various courses of action to select the 'best' alternative while minimizing the costs (George 1980). The rational choice theory incorporates all relevant options to conduct

a cost-benefit analysis on the possible outcomes resulting from the various courses of action (Maoz 1981). The mechanism that leads the decision maker from the chosen actions to the outcome is that each actor ranks the outcomes from best to worst and then chooses an action which produces the highest ranked outcome (Morrow 1995). The action that is chosen "depends on both the actor's preferences over outcomes and its knowledge about how actions produce outcomes" (ibid: 3). The problem with rational choice as an explanatory theory of foreign policy decision making is that the three requirements needed for rational calculation are often imperfectly met in foreign policy issues (George 1992). Therefore, the decision maker must proceed with uncertainty.

The uncertainty associated with the decision making process limits the acceptability of the rational choice theory. Because it is believed that actors typically are not certain about the consequences of their actions, the "lack of certainty is represented by a probability distribution for each action that gives the probability of each outcome occurring if that action is chosen" (Morrow 1995: 3). These constraints on the decision making process, resulting from the lack of certainty, encourage the decision maker to rely on cognitive aids and simple decision rules to aid the process (George 1974).

One such cognitive aid is the use of a "satisficing" rather than an "optimizing" decision strategy (see Simon 1955; March and Simon 1958; Cyert and March 1964). Because an application of the "optimizing" decision rule requires enormous amounts of

information and resources, decision makers tend to settle for a course of action that will "work" or will be sufficient (George 1992). In addition, incrementalism is used to aid in the decision making process (see Lindblom 1959; Lindblom and Braybrooke 1963). This takes the strategy for single decision problem and converts into "a strategy covering a whole sequence of decisions aimed at improving the present state of affairs gradually by means of small steps" (George 1992: 462). The strategy of incrementalism is taken one step further bringing with it a framework of sophisticated policy planning by using a strategy of sequential decision making (ibid: 463). Sequential decision making attempts to break up big policy decisions into a series of smaller-step decisions over time, and deal with different uncertainties at optimal points of interrelated decisions (George 1978). These strategies used to negate the limits on the rational choice theory of foreign policy decision making are indicative of the parameters of the cybernetic theory of decision making.

The cybernetic theory of decision making suggests that the decision maker operates in an environment of "structural uncertainty" (Steinbruner 1974: 18), and he/she "is not able to determine the state of the environment, locate available alternatives, or assess the consequences of those alternatives-in short, the raw materials of rational choice are absent" (Ostrom and Job 1986: 542). In this case the decision maker evaluates a limited set of essential factors and considers a restricted set of decision options (ibid). Simon (1959) argues that it is necessary to account for the 1) cognitive structure of the decision maker; 2) the formulation and content of his decision

premises; and 3) the logic of the inference process. Presumably the cognitive structure of the decision maker will influence him to catalog only the general aspects of the environment rather than exhaustively consider each and every one of the options available to him. In addition, the cybernetic decision maker will structure his information search and evaluation of the alternatives around a select number of premises (Ostrom and Job 1986). Each premise will specify the "computational procedures for assessing the state of the environment and its implications for actions" (Simon 1959: 274). It is the cybernetic approach to decision making which accounts for the element of uncertainty in decisions while rational choice theory is limited by lack of certainty in most foreign policy decisions.

Within these two schools of thought, much of the past work on decision making has focused on *static* decision making situations where the choices have remained constant, and have been available to the decision maker from the outset (Bueno de Mesquita and Lalman 1990; Bueno de Mesquita 1992; Ostrom and Job 1986; James and Oneal 1991). However, literature has revealed that even such monumental events as the Cuban Missile Crisis presented the decision makers with appearing and disappearing alternatives throughout the situation (Allison 1969; Anderson 1983).

More recent events have similarly proved that alternatives are not fixed, but rather they are in a constant state of flux. Foreign policy crises are often characterized by a choice set that evolves once the crisis is in progress, such as was evident during the Haitian crisis of September 1994 when President Clinton opted to send a delegation

headed by former U.S. President Jimmy Carter to try to negotiate a resolution to the crisis (Mintz, Geva, and Redd 1994). For example, at the beginning of a crisis, there may be only two options apparent, such as send in the troops or do not send in the troops. However, after collecting more information it may become apparent that working with other allied nations to resolve the crisis may be the best alternative to minimize loss of life and resolve the issue. The dynamic nature of choice sets presents new strategies to study in terms of how leaders make decisions and what are the specific processes employed in making foreign policy decision.

The decision strategy used during a foreign policy crisis may be defined as the procedures "that the decision maker engages in when attempting to select among alternative courses of action, and a decision rule that dictates how the results of the engaged-in procedures will be used to make the actual decision" (Beach and Mitchell 1978: 439-440). One possible strategy is expected utility where "the procedures are the computation of product sums of subjective probabilities and utilities for each alternative and the decision rule is maximization-selection of the alternative with the maximum product sum" (ibid 1978: 440). Another type of strategy is alternative-based. Evidence also shows that when information is processed by alternative, rather than by dimension or attribute, the outcomes are likely to be very different (Mintz and Geva 1994).[1] The outcome of the decision making process is highly dependent upon the strategy process

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In the field of political science, dimension-based processing involves collecting and categorizing the information according to related areas. For purposes of this study the dimensions evaluated are: political, military, economic, and diplomatic.

selected (Herek, Janis and Huth 1987; Payne, Bettman, and Johnson 1988).

The strategy and outcome are dependent upon the approach adopted by the decision maker. In addition to the rational actor and the cybernetic approaches already mentioned, a third approach has been offered by Mintz and Geva (1994). The poliheuristic theory of foreign policy decision making draws on research from experimental cognitive psychology on heuristics (Mintz, Geva, and DeRouen 1994) which has been tested by over 800 students. In one sense this theory has been compared to the rational choice approach in that it asserts that "actors are trying to achieve the preferred ends through their choices" (Morrow 1995: 5). However, it also includes elements of the cybernetic theory in that it "tries to account for how actors collect and combine information when faced with an uncertain choice" (Morrow 1995: 8). This theory "highlights the cognitive mechanisms that mediate foreign policy choices and behavior. The theory incorporates the conditions surrounding foreign policy decisions, as well as the cognitive process themselves (i.e., the "why" and "how" of decision making), thus, addressing both the contents and the processes of decisions" (Mintz and Geva 1994a: 1-2).

This paper presents the results of an experimental test of the poliheuristic theory of foreign policy decision making, using the Foreign Policy Decision Board Simulator as created by Mintz and Geva (1994b). This study is a replication and extension of the previous studies conducted using undergraduate students (Mintz, Geva, and Redd 1994). It tests the hypotheses that different strategies are employed by "experienced"

decision makers as opposed to those selected by "inexperienced" decision makers; that the familiarity of the choice sets will largely impact the strategy selection; and that a heuristic, dimension-based strategy will be used when the decision maker is faced with a static choice set, while an alternative-based, analytical method will be used when a new alternative emerges in the midst of a crisis. These tests intend to bridge the gap in the reliability of experimental data on foreign policy decision making by expanding the study beyond undergraduate students and including actual military commanders and cadets as subjects. This paper begins with a brief summary of the poliheuristic theory of foreign policy decision making. Second, The Foreign Policy Decision Board Simulator (Mintz and Geva 1994a) is explained as it is the means by which these hypotheses are tested. Finally the results are presented.

This study is distinguished from previous studies (e.g. Mintz and Geva 1994a, 1994b; Mintz, Geva, and Redd 1995) in that the subjects include military officers and military cadets. It has been noted that "people draw heavily on accumulated experience to aid their understanding [of a complex situation]. The more experience they have, the more easily and thoroughly they can assimilate new information" (Fiske, Kinder, and Larter 1983). This study attempts to distinguish how actual military leaders and future leaders with various backgrounds and levels of experience organize and process information as they are faced with a decision.

Military officers with several years of operational experience including time served as a commander are defined as the "experienced" group of decision makers.

Military cadets are defined as a "semi-experienced" group of decision makers because they have some institutionalized decision making experience and knowledge, but limited operational experience. Finally, these data will be compared with the results of a study using undergraduate university students (previously reported by Mintz, Geva, and Redd, 1994) to compare the preceding experienced and 'semi-experienced' decision makers to this group of "inexperienced" decision makers.[2] Not only will this provide insight into decision making in the military environment, and thus contribute to the external validity of the previous experiments, but it will also serve to provide insights in strategy selection for decision making in various environments. Furthermore, replicating the study with various groups of subjects, will assure the reliability of the Decision Board Platform as a research tool. These tasks are being conducted to gain more understanding about the decision making process and to provide more insight into the usefulness of the Foreign Policy Decision Board Simulator.

2

Undergraduate students in this paper are presumed to be "inexperienced" foreign policy decision makers. Usually undergraduate students are between the ages of 17-22 and contain minimal work experience and no foreign policy experience.

THE POLIHEURISTIC THEORY OF DECISION

The poliheuristic theory of foreign policy decision making defines an approach which evaluates the cognitive processes involved in reviewing a choice set and the consequent selection of an alternative. It is claimed that in better understanding the process by which decisions are made, some information may be gained as to why certain decisions were made (Mintz and Geva 1994b). The poliheuristic theory of foreign policy decision making is characterized by five parameters. They are 1) nonholistic/nonexhaustive search, meaning that not every piece of information is obtained prior to the selection of an alternative, 2) a dimension-based search reviewing the broad areas of information rather than reviewing the information by alternatives, 3) noncompensatory, 4) a tendency toward 'satisficing', in examining the information so as to obtain the most "acceptable" alternative rather than the "optimal" alternative and 5) an order sensitive search in which the order of presenation of alternatives and dimensions affects the outcome (Mintz and Geva 1994a). The following is a summary of the five characteristics of processing decisions according to the poliheuristic theory. For more inclusive definitions of these concepts see Mintz and Geva (1994b).

The nonholistic character of decision making assumes that decision makers do not obtain every piece of information available prior to making their decision. Many times it is not even possible to obtain all the information available. However, even more often is the case in which the decision maker does not try to obtain every piece of

information because the cost is too high. Every decision is presumed to have a cost associated with it, whether it be the cost of obtaining the information or the cost incurred because of time constraints. Especially in crisis situations, the decision maker must choose how much he/she can afford to spend in time and resources for information needed to make a decision. Within the foreign policy arena, leaders are often faced with pressures from the public, the media, other nations, and global organizations to act quickly in certain crisis situations. A balance must be achieved in deciding how much information needs to be collected to reach a conclusion about the course of action to pursue.

In the dimension versus alternative based search for information, a dimension based approach to decision making is demonstrated in this model. Rather than looking at various alternatives directly, the decision maker is inclined to review the information in terms of dimensions. For example, the decision maker would assimilate all the information pertaining to the economic impact of the various alternatives and then look at the alternatives related to the military, diplomatic, etc. dimensions. This also implies that a constant amount of time is not spent on each alternative when making decisions. Some dimensions may weigh more heavily than others for the decision maker and this will affect the alternative selected. This concept is also measured in this study. By using the Foreign Policy Decision Board Simulator with the various subjects, this study presents the particular circumstances and subjects that chose to use a dimension -based strategy rather than an alternative-based strategy in the information search.

The noncompensatory versus compensatory parameter of the poliheuristic theory of decision making is based on strategies used to select alternatives. Applying this parameter of the theory requires a decision maker to find a particular alternative unacceptable in a given dimension. The noncompensatory approach follows that a high score on another dimension of that same alternative will not compensate for the low score. This means that the alternative must be eliminated altogether. Therefore, leaders do not make trade-offs along dimensions for "unacceptable" alternatives, but instead will move to another alternative for selection (Mintz and Geva 1994).

The satisficing principle represents how decisions are made on the basis of certain criteria that has reached a given threshold. This is in accord with the nonholistic characterization in that once a certain alternative is found to have reached a pre-established threshold, it will be chosen without any further inquiry into the characteristics of other alternatives, not yet reviewed. Satisficing explores the principle of using a particular strategy in finding an *acceptable* alternative rather than a *maximizing* alternative. In Klein's 1989 study of military decision making he notes "that the experienced decision makers are not searching for the best option. They only want to find one that works, a strategy called 'satisficing'" (p. 59). It is presumed that when time constraints are placed upon the decision maker, the task changes significantly. Rather than finding the perfect solution, the decision maker is looking to find a solution that will function. Whether decision makers are 'satisficing' or whether they are using the strategy of expected utility and finding the "optimal" choice is also tested in this

study.

Finally, an order sensitive search is described as one that recognizes that the sensitivity of the order in which the alternatives and dimensions are presented to the decision maker will affect the ultimate choice. It is presumed that the alternatives presented to the decision maker first, will be viewed differently from those presented last (Mintz and Geva 1994: ch.8) In addition, the different dimensions and how they are viewed are sensitive to the order in which they are presented.

In summary, the poliheuristic model is nonholistic, dimension-based, noncompensatory, satisficing, and order-sensitive. It captures the heuristic nature of the foreign policy decision making process (Mintz and Geva 1994b). Rather than simply trying to predict the outcome of the decision, this model more intensely explores the process and the outcome of the process of decision making.

Within these five parameters, the decision process contains two stages: first, where there is an initial screening of available alternatives; and second, selection of the best alternative from the subset of remaining alternatives in an attempt to minimize risks and maximize rewards (Mintz and Geva 1994a: 5-9; Mintz and Geva 1994b: ch 2; Mintz, Geva, and Redd 1994: 3).

The foreign policy decision board as a platform has been used as an experimental tool to analyze these five processing characteristics of the poliheuristic theory. To better understand the term "poliheuristic" an explanation of the name may be helpful. There is a strong emphasis on the weight given political aspects of decisions by national

figures, hence the "poli" portion of the name chosen by Mintz and Geva. They theorize, for political leaders, "domestic politics is the 'essence of decision'" (Mintz Geva 1994b: 2). Therefore, the timing of elections, popular support, constituency building, the state of the economy, and political parties will all play crucial roles in the particular foreign policy decisions adopted by leaders (Mintz 1993). Thus, decision outcomes by the president of a country are often dependent on the amount of emotional backing provided by the people. This is known as the 'rally round the flag' effect (Mueller 1973; Kernell 1978; Brody 1984). This political aspect plays a very important role in the foreign policy decision making process.

The second element of this theory is that decision makers have many (poly) heuristics to use when making decisions (Mintz and Geva 1994: 2). As the difficulty of the decision task increases, decision makers have enacted simplified methods to ease the cognitive strain of making the decision (Fiske, Kinder, and Larter 1983; Klein 1989). History has revealed that decision makers employ short cuts to organize and simplify the decision making process, especially when many variables are influencing the input (Klein 1989; Sniderman, Brody, and Tetlock 1991: 19; Mintz and Geva 1994b). The decision making strategy used is especially contingent upon the difficulty of the task (Olshavsky 1979; Payne, Bettman, and Johnson 1988).

The poliheuristic theory of foreign policy decision making suggests five parameters of the decision making process that are essential to a complete understanding of this area of study. Within these five parameters, variables such as the

familiarity of choice sets and the dynamic and static nature of the alternatives can be tested. A test of the effect of these variables on decision making strategies within groups of various experience levels is significant to a better comprehension of the foreign policy decision making process.

One aspect of decision making that affects the strategy used to select the ultimate choice is the familiarity of the decision maker with the choice sets (Mintz and Geva 1994a). By invoking information search patterns with familiar and unfamiliar choice sets, findings reveal that a dimension-based pattern is characteristic of the decision maker's approach to unfamiliar scenarios. However, when the decision maker is familiar with the alternatives, he/she will choose to pursue an alternative based search of the choices (Mintz, Geva, and Redd 1994: 6). This factor may become especially important when there are time constraints placed upon the decision maker. Often the stress placed upon the decision maker is because of the urgency of the crisis. In terms of war and peace, time is often of the essence. This will also become an important factor when there are experienced decision makers at the helm as compared to inexperienced decision makers.

The difference between experienced and inexperienced decision makers is explained by Fiske et al, 1983, "the essential implication of the differences in knowledge content-amount and structure-is that not only do experts know more than novices, but also their knowledge is more tightly organized. Thus, despite the greater quantity of information available to them, they can handle it more efficiently. Specifically, tighter

organization of information implies that experts can hold more in short-term memory" (p. 384). In this manner experienced decision makers may be able to handle time pressures more calmly and competently than inexperienced decision makers.

There are several decision strategies employed by experienced decision makers, which are not necessarily employed by inexperienced decision makers. Simply looking at the alternatives is one strategy employed by both, experienced and inexperienced decision makers (Klein 1989). However, when time and information constraints are placed upon the decision maker, Klein's study indicates that "experienced decision makers are able to use their experience to recognize a situation as familiar, which gives them a sense of what goals are feasible, what cues are important, what to expect next and what actions are typical in that situation" (Klein 1989: p. 58; Chase and Simon 1973; Fiske, Kinder, and Larter 1983). This notion will be further explored as the results of the military commanders' decisions to use force versus other options which are presented. It is expected then, that the familiarity of the choices and the level of experience of the decision maker will significantly influence the strategy and thus, the final outcome. The extent to which the familiarity of the choice set affects the strategy with various groups of subjects (experienced, semi-experienced, and inexperienced) is reported in this study.

STATIC V. DYNAMIC CHOICE SETS

A previous study has tested and reported that decision makers, faced with a static choice set, are more likely to employ heuristic, dimension-based strategies of decision making (Mintz, Geva, and Redd 1994). The authors also proposed that when a subset of alternatives is being evaluated and a new alternative emerges it "is likely to be compared to the other alternatives according to an alternative-based, analytical method" (Mintz, Geva, and Redd 1994: 10). Without change in choice sets, the likelihood of a change in strategy is limited (ibid). However, because the decision maker must decide what to do with this new alternative, his/her search pattern will encompass an alternative-based approach (Mintz, Geva, and Redd 1994). Therefore, when a decision maker faces a static choice set, he/she uses a dimension-based strategy. When he/she faces a dynamic choice set, an alternative-based strategy is used.

METHOD

The Decision Board Platform: A new research platform has been introduced by Mintz and Geva to test some of the key propositions of the poliheuristic theory (Mintz and Geva 1994). The Foreign Policy Decision Board Simulator, is the platform upon which these authors test the poliheuristic theory. The present research involved using this computer simulation program on United States Air Force Officers, members of the Corp of Cadets at Texas A&M University, and was combined with the data collected on undergraduate students from Texas A&M by Mintz, Geva and Redd, 1994.

Subjects: For this experiment, the subjects were Air Force Officers from the United States Air Force Academy in Colorado Springs. Forty four Air Force Commanders including 2 Brigadier Generals, 12 Colonels, 13 Lieutenant Colonels and other officers involved in vital national security and defense related decisions participated in the experiment.[3] Their active duty time in the Air Force was at least 8 years, and in most cases the number of years serving in the military was much higher. For this experiment 36 of the officers were instructors in the faculty, with the other 8 officers assigned to various areas located within the Air Force Academy (e.g. Air

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[3] It is presumed that because of their time in service, their rank, and their selection to the Air Force Academy, these officers have extensive experience in command positions. By the nature of their positions, they would have been involved in many critical decisions regarding personnel or functions in support of the nation's defense.

Officer's Commanding, administration officers, personnel officers, etc.).

A second experiment was conducted using 55 cadets from the Corps of Cadets at Texas A&M University. All the cadets were in their senior year and will be commissioned in the service following graduation. The cadets were given an incentive of $4.00 to participate in the study. This was offered with the intention of gaining more realistic results by adding an incentive for the cadets to utilize the Decision Board Simulator as though they were actual decision makers.[4]

A total of 48 Corps Cadets used the Decision Board Simulator. This allowed for 12 subjects in each experimental scenario. Duplication of results ensures all variables are accounted for and validates the tool used to collect and measure the data as legitimate. The results from these experiments are useful when combined with the results from the previous experiments done using undergraduate students. This helps in comparing results of the simulation administered to inexperienced decision makers (undergraduate students). All of the experiments share the same design using the Decision Board Platform as a "process tracer." In all the experiments the subject were randomly assigned to experimental conditions.

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The monetary incentive was used in the study with the cadets as well as the undergraduate students to sensitize subjects to a loss aversion dynamic, which is a dominant motivation in politics (see Anderson 1983; and Mintz 1993). It should be noted that all subjects received the compensation upon completion of the experiment.

Research Material: There were two decision tasks used in this experiment. The first consisted of a scenario with unfamiliar alternatives. It asked the user to decide where to locate a naval base.[5] The choice sets for this scenario include four possible sites Alpha, Beta, Charlie, and Delta, all of which were completely unfamiliar to the user.

The second, familiar, scenario asked the user to decide how to respond to a military dispute between two small island nations contesting for control of a large uranium field (Mintz and Geva 1994b). As a result, one nation invaded the other and in addition, foreign citizens were being held as hostages. In this context the decision maker, acting as Commander-in-Chief, must decide upon the use of force (attacking the invader), containment (instituting a blockade), international sanctions, and isolationism (doing nothing). The information was presented to the decision maker by chief advisors including: "the Chairman of the Joint Chief of Staff", "Secretary of State", "Political Advisor", and the "Chief Economic Advisor" (Mintz and Geva 1994b: 16).[6]

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The scenario was changed to the selection of a naval base, as many Air Force Officers are not as familiar with the logistics and components necessary for this type of an operation. In addition, it is the unfamiliarity with the alternatives, rather than with the subject of the decision, which are evaluated in this study. Another point can be made. For most foreign policy decisions, the general issue is not completely unfamiliar to the decision maker. Much more likely is that the options or the possible courses of action will be unfamiliar. This is why the scenario of where to locate a naval base for Air Force Officers may be presented as an unfamiliar choice set.

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The information concerning the advisors was provided to the decision maker in the initial set of instructions. They were to advise the decision maker with respect to the scenario on military, diplomatic, political, and economic affairs.

Thus the scenarios encompassed four dimensions of choice: diplomatic issues, military concerns, economic ramifications, and political consequences. Therefore, this decision involved familiar and unfamiliar choice sets within the four dimensions.

In addition to the familiarity of choice sets, the element of static and dynamic choice sets was tested with the various experimental groups. The test of the static structure of the decision to use force consisted of a 4 x 4 decision matrix. Figure 1 depicts the decision board simulator as presented to the user on the computer screen. All four of the alternatives across each dimension were presented to the decision maker from the outset of the session. Other subjects were randomly assigned the same scenario with a minor alteration in the choice sets available. The dynamic structure of choice sets test initially presented the user with a 3 x 4 matrix (see Figure 1). This allowed the user to choose among three alternatives along four dimensions. The fourth alternative, or the decision to use force, was not shown on the screen at the beginning. After the subject had opened the sixth information bin, a message appeared informing the user that a new alternative had now become an option.[7] This new alternative was briefly described and then added to the screen, resulting in a 4 x 4 decision matrix. In this experimental test, the impact of static and dynamic choice sets on decision strategy was evaluated with the various groups of experienced and inexperienced decision makers.

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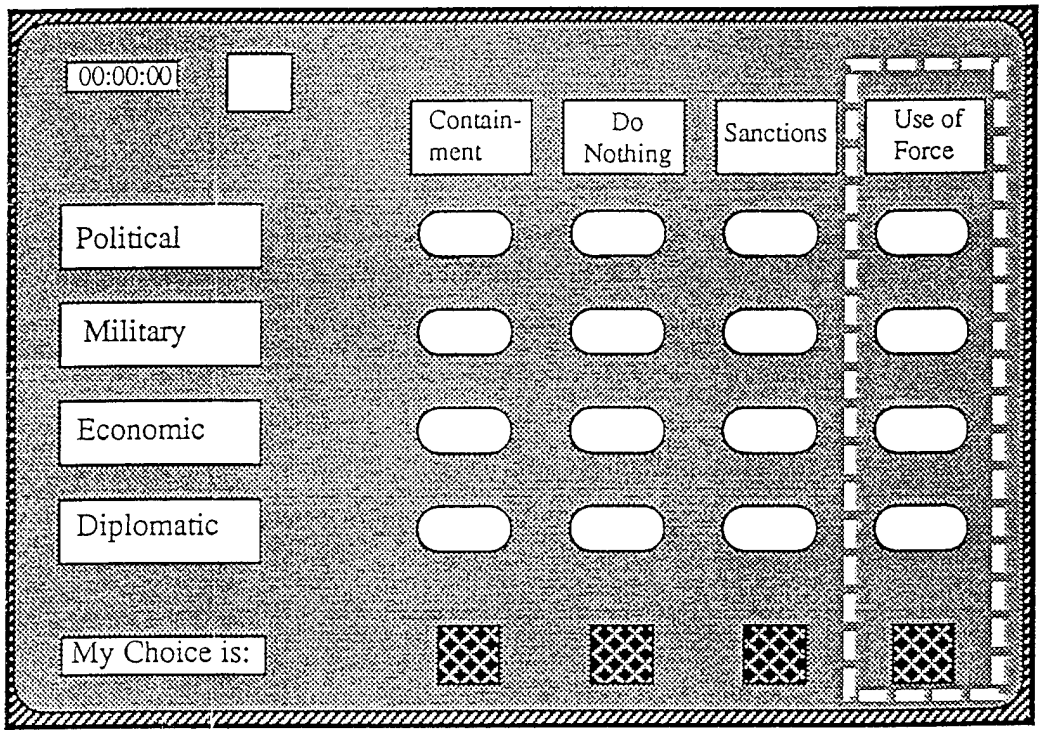
[7] In situations where the decision maker opened less than six information bins, the case was thrown out, because there was not enough data collected to include it with the rest of the results.

Using this combination of scenarios and structures there were four possible situations that the decision maker faced: a situation with a familiar alternative and a static choice set; unfamiliar alternatives and a static choice set; familiar alternatives with a dynamic choice set; or unfamiliar alternatives with a dynamic choice set.

Figure 1. The decision matrix as displayed on the monitor in the conflict scenario*



* The dashed rectangular box marks the part of the decision board that appeared late in the dynamic condition, while being present up front in the static condition.

The Research Instrument: Paralleling the study done by Mintz, Geva, and Redd (1994), a 4 (alternatives) by 4 (dimensions) matrix was utilized in these experiments. The decision board was programmed by members of the Program in Foreign Policy Decision Making at Texas A&M University as a SuperCard application for Macintosh. This platform consists of a matrix of decision alternatives and decision dimensions. The task for the decision maker consists of a choice of one of A_i alternatives which are evaluated along D_j different dimensions (Mintz and Geva 1994b: 13). Within the intersection of these alternatives and dimensions are information bins which contain information. To reveal the information found within each bin, the user clicks the mouse on that particular bin. The computer will then record the order in which the information bins are opened, the number of times each alternative and each dimension are viewed by the decision maker, and the amount of time that elapses from the beginning of the task to the selection of a choice. Using this data, information can be gained concerning the process tracing characteristics of decision making by leaders and decision makers (ibid).

Within the decision matrix 16 "information bins" (IB) are provided to the decision maker. Each bin contains information pertaining to the evaluation of a given alternative along a specified dimension. An example of the statement found within the information bin corresponding with the economic dimension of the containment alternative is: "Containment of the crisis can prevent the disruption of trade flows to and from the surrounding countries. It also involves less investments than the use of force. I would rate this alternative as a 6". Figures 2-a and 2-b reveal the statements contained within each bin.

The decision maker is allowed to view each of the 16 information bins only once. In addition, the statement is followed by a summary evaluation giving the alternative a numerical ranking. The numerical value was assigned by Mintz and Geva to give 'the use of force' and 'Delta Island' the greatest averaged value among the dimensions. This allows the decision maker to make his decision based upon the highest utility of a choice. The value structure of the alternatives is presented in Figure 3. Upon completing their decision making process, the decision maker, using the mouse, clicks on the choice button corresponding to the selected alternative.

Figure 2-a. Statements presented to decision makers in force scenario

	Alternatives			
Advisors	Containment	Isolationism	Sanctions	Use of Force
political	"If we send in troops to prevent trade we can appear strong and garner high public opinion without actually risking high casualties; although you may be hurt at the polls in the upcoming election if we have not yet resolved the crisis." 3	"This is safe. If the crisis is kept quiet the public will assume that we have done well. The public often prefers to stay out of other's affairs." 9	"Sanctions are politically safe because the public usually prefers to be patient in situations like this. However, there is the slight possibility that if the crisis is prolonged because of the wait for sanctions to take effect, your chances for reelection may be hurt." 4	"A use of force in this case is unwise. The public knows that the U.S. does not have a vital national interest here and, if casualties are as high as expected, then you will take the blame come reelection time." -9
military	"This shows the international community that we are unable to protect our interests. It also prolongs the problem and subjects our military forces to greater risk which will ultimately lead to greater U.S. casualties." -9	"This would show that the U.S. only resorts to force as a defensive reaction. This would also mean no casualties; however, there is the possibility that isolationism will damage the future credibility of U.S. military forces." 2	"Sanctions give the military time to prepare for any possible confrontation with the invading forces. This of course reduces the chance of U.S. casualties." 7	"The use of force shows that we are strong enough to protect our vital national interests and shows other neighboring countries that they cannot take advantage of us." 7
economic	"Containment of the crisis might prevent the disruption of trade flows to and from the surrounding countries; although not solving the crisis quickly might destabilize the world economy." 3	"Ignoring the problem may be safe politically, but economically it could mean disaster. Allowing the possible nationalization of the U.S. firms would destabilize the stock market." -8	"Economic sanctions create a dependency whereupon our allies such as Germany and Japan must compensate us financially. Also, it could mean more trade for the U.S." 6	"A use of force will create an economic boost as well as prevent the invading forces from nationalizing our enormous investment of resources in this country." 8
foreign affairs	"Containment will show the world that the U.S. does not always have to resort to the use of force. It also shows that the U.S. is willing and patient enough to gather support for its initiatives from neighboring countries ." 10	"By asserting that the conflict is a regional matter and not becoming involved, the U.S. can preclude international criticism as a bully. The crisis can be 'defused'. However, we may also be perceived as a paper tiger, unable to assert ourselves in the world arena." 4	"Economic sanctions would not be effective in this case because the international and regional communities would realize that sanctions only prolong the crisis. The U.S. cannot afford this loss of prestige." -10	"This demonstrates to surrounding countries that the U.S. will not allow an aggressor nation to wantonly attack a weaker neighbor. However, we may be perceived of as 'bullies' or as the world's policeman." 4

Source: Mintz and Geva 1994

Figure 2 Cont. Statements presented to decision maker in Navy scenario

Advisors	Palau Island	Gilbert Island	Wake Island	Nauru Island
political	"Since most of the public knows nothing about this place, it will not harm you to put the base here; although, it also won't bring you any special recognition either." 3	"Previous administrations attempted to build a naval base here and were denied. Your success in establishing a base here would translate into positive ratings in the polls." 9	"A new base here would increase your standing in the polls and your overall popularity. However, since the public knows little about this island your political gains won't be extraordinary." 4	"There is no logic in placing the naval base here. Voters may punish you for any collaboration with a nation that has such a poor record concerning human rights issues." -9
military	"The only site available is not conducive to military operations because of its vulnerability to attack from local guerrillas." -9	"This site will help shore up naval defenses in the area, especially with regard to recent efforts at collaboration and training with the local military." 2	"Offers an opportunity to control most of the strategic waterways and oceans east of the Asian continent." 7	"This location is a good strategic choice because of the advantage the U.S. navy will have in controlling the South China Sea and the entire Indian Ocean." 7
economic	"We will be the first foreign influence in the area and should therefore, benefit from the new relationship by having a new market for our exports; though it should be noted that the initial costs of building a base here may be quite high." 3	"Prohibitively expensive. Building a naval base here would in effect 'break' the budget, especially in light of recent budget cuts." -8	"We can strengthen our economic relations with this nation by building the base here. Discoveries of enormous amounts of Polanium (a raw material for futuristic energy-based industries) near the island's shores makes the island economically important." 6	"An already existing infrastructure helps defray the costs of building a new base here. With the shrinking military budget, this is the best economic choice which will provide the best return on our investment of time, money, and resources." 8
foreign affairs	"This demonstrates to neighboring countries and areas that the U.S. is willing to help minimize foreign threats, as well as protect a weaker nation from a potential aggressive adversary. This helps increase both regional and world stability." 10	"Choosing this site will demonstrate that the U.S. sticks to its international commitments and that we can be trusted about our intentions to be involved in maintaining the region's security; although there is the minimal risk of offending one or two other states in the region." 4	"This choice would lead to a breakdown in relations with many of the surrounding islands. This would severely hurt U.S. influence and power in the region." -10	"Constructing a naval base here adds to the stability of the region and demonstrates to the world that we are resolved to be where it counts internationally. However, there is a very slight chance that neighboring countries will view our actions as 'meddlesome'." 4

Figure 3. The value structure of the decision board

	A_1	A_2	A_3	A_4
D_1	3	9	4	-9
D2	-9	2	7	7
D_3	3	-8	6	8
D_4	10	4	-10	4

Source: Mintz and Geva 1994

Design: The design duplicates a study conducted by Mintz, Geva, and Redd in 1994 using undergraduate university students as subjects to test the decision board simulator. The experiments with the Air Force Officers, and the Corps of Cadets used a 2 x 2 between groups factorial design. The factors in the design included: (a) Familiarity with the Choice Set (familiar alternatives vs. unfamiliar alternatives); and, (b) Structure of the Choice Set (dynamic vs. static choice sets). To measure the different decision strategies used in the four experimental conditions with the experienced, semi-experienced, and inexperienced decision makers, the dependent variables consisted of several process tracing patterns of decision making: information acquisition patterns; amount of information acquired; and the specific choices subjects made (Mintz, Geva, Redd 1994).

Procedure: For these experiments the foreign policy decision board simulator was used in a computer laboratory where each subject operated individually on the decision board platform. The subjects all began the experiment at the same time with a practice session to familiarize them with the decision board. For the actual experiment, subjects assumed the role of the Commander-in-Chief and leader of the nation, and were allowed only the advice from their advisors and their own pre-existing knowledge of the subject. They had to make a decision among the choice sets depending on the scenario presented to them. The instructions presented on the computer screen included the statement that the "quality of decision you make in the context of the simulation will

suggest your ability to comprehend national-level decision making" (Mintz, Geva, and Redd 1994: 16). This was important because it was intended to act as an incentive for the decision maker to take this project seriously. In addition, the money the Corps Cadets were promised was made on the condition of their making a "correct" decision.[8] As current and future military leaders, it was presumed that competition and the urge to succeed would also serve as motivation for these cadets to perform the experiment to the best of their abilities. It became apparent in the observation of the Air Force officers especially that they wanted to get the "right" answer. Post-experiemnt debriefings showed that they were very concerned about how they "scored" on the test. Following completion of the simulation subjects were fully debriefed about the objectives of the study and provided the opportunity to ask about aspects pertaining to the poliheuristic theory of foreign policy decision making, or the decision board simulator.

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8 All the cadets received the money.

RESULTS

Study I: Decision Making by Members of the Air Force Elite

The analysis of results is based on two aspects of decision making. The first test looks at whether the use of alternative or dimension based strategies is affected by dynamic versus static choice sets. The control in this particular case was the familiarity of the decision maker with the various options. The second test focuses on the effects of the decision matrix (content and structure) on the choice sets selected (Mintz, Geva, Redd 1994).

A nation's foreign policy is often defined by decisions made during crisis situations. The decision process employed and the strategy used by the decision maker is likely to affect the outcome (Mintz, Geva, Redd 1994). In this study, dynamic choice sets are examined. It has been theorized (Mintz and Geva 1994b; Mintz, Geva, and Redd 1994) that the emergence of a new alternative will encourage the decision maker to switch strategies in the middle of the crisis. This is in an effort to lighten the cognitive load. This shift will be from a dimension-based search to an alternative-based search. It seems the emergence of a new alternaitve encourages the deicsion maker to focus on the alternatives at this point in the conflict. The effect of an emerging alternative is also analyzed in situations where the decision maker is familiar with the choice sets and when he is faced with an unfamiliar choice set. The possibilities of future research implications resulting from these studies are multiple. Of interest is the effect of a disappearing alternative on the selection of strategy, as this too, is a real

world possibility (Mintz, Geva, and Redd 1994).

The data analysis followed the methods used in Mintz, Geva, and Redd 1994 so that comparisons among groups is feasible. In this paper it is suggested that decision makers can employ more than one strategy en route to making a choice. Therefore, the dimensional vs. alternative-based strategies were analyzed.

Information Search Index: As in Mintz, Geva, and Redd 1994, an information search index developed by Billings and Scherer (1988) was used to code the moves of the subjects on the decision board as recorded by the computer. The definition of the scoring by Billings and Scherer (1988) is:

> Each move to a new piece of information which was within the same alternative and across dimensions was classified as an interdimensional move (alternatively based), while a move within a dimension and across alternatives was labeled as intradimensional (dimensional based). Moves to both a different alternative and a different dimension were labeled shifts. The search pattern variable is defined as the number of alternative-based moves minus the number of dimensional moves divided by the sum of these two numbers (shifts were disregarded from this index)" (p.10).

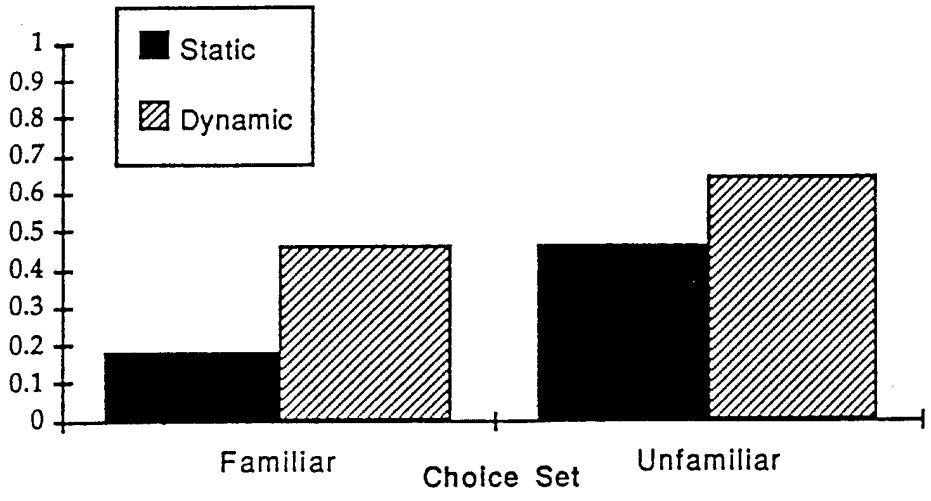
It was scored by adding the number of dimensional moves (d), the number of alternative moves (a) and the number of shifts (s). The equation to define the Search Index was SI=(a-d)/(a+d). With this search pattern, positive numbers imply more alternative-based moves, while negative numbers express dimensional moves (Mintz, Geva, and Redd 1994).

Using this information search index, this formula was calculated for the search

pattern used by subjects as they opened the first six items of information. It was then compared to the search pattern used by subjects as they opened the remaining items of information.

To test the dynamic structure, the frequency of subjects who changed their strategy between the two phases in the experiment was calculated. Figure 4 presents the proportion of subjects that changed their decision strategy between the two phases.

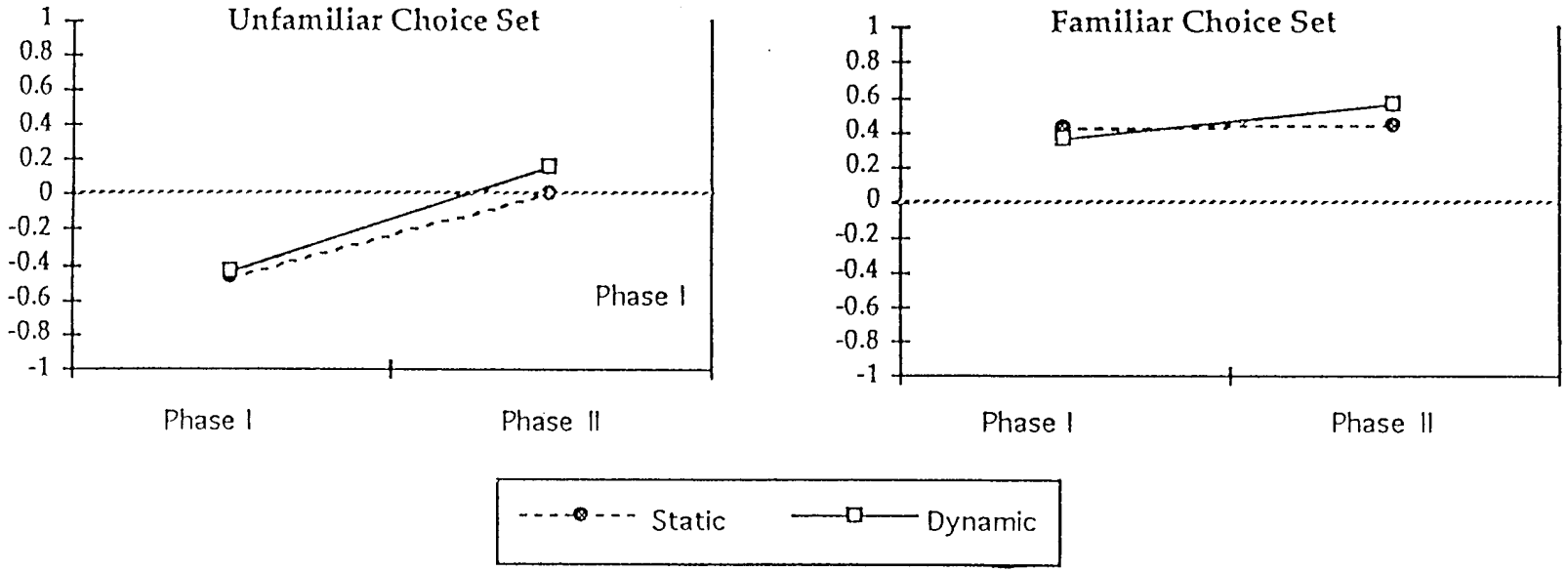
Figure 4. Proportion of Air Force Commanders changing processing strategy as a function of dynamic vs. static choice set and the familiarity of the choice set



These findings were initially presented in Mintz, Geva, Redd, and Carnes, 1995. They indicate that among the experimental group exposed to the dynamic choice set, 55% of the 'experienced' decision makers changed their decision strategy during the information search, while only 32% of the 'experienced' decision makers changed their decision strategy when they faced a static matrix. This difference is statistically significant by the z test for proportions (Langer and Abelson 1972) ($z=1.63$ $p<.06$). Furthermore, a change of strategy was more evident in decisions involving an unfamiliar choice set (57%) than in decisions in a familiar choice set (38%) ($z=1.66$ $p<.05$).

This suggests that experienced decision makers change their strategy when they are gathering information when a new alternative surfaces. To understand how different strategies are used during different phases of the decision making process a 2 x 2 x 2 split-plot ANOVA was conducted on the search index (SI) scores of the two phases. The findings are presented in Figure 5. It appears that the experienced decision makers tended to begin the information search utilizing a dimension-based strategy, and then, as the task proceeded, shifted toward an alternative-based strategy. The difference between the SI at phase I ($M=-.03$) and the SI at phase II ($M=.29$) is significant, $F(1,40)=17.70$ $p.<.0001$.

Figure 5. SI scores of Air Force Commanders for the two phases of data acquisition as a function of dynamic vs. static and familiar and unfamiliar choice sets



As predicted, a strong main-effect for the familiarity factor was obtained $F(1,40)=8.74$ $p<.005$. Therefore, the unfamiliar choice set (which is cognitively more demanding) led to a more clearly dimension-based pattern (M=-.18) than the familiar choice set (M=.45). Moreover, the shift from dimension-based processing toward an alternative-based strategy was more clearly defined in the unfamiliar choice set (SI/I= -.45; SI/II=.08) than in the familiar choice set (SI/I=.39); SI/II=.50). This statistical interaction was also significant $F(1,40)=7.49$ $p<.01$ (see Mintz, Geva, Redd, and Carnes 1995: 20).

These results support two major propositions of the poliheuristic theory of decision making initially reported in Mintz, Geva, Redd, 1994.

> First, the theory posits a two-stage process by which decision makers first screen alternatives using cognitive heuristics in a dimension-based process, and then, as the number of 'acceptable' alternatives is reduced, employ a more analytic/alternative based process. The second proposition addresses the cognitive underpinning of the previous proposition. Specifically, it states that complex decision tasks, i.e. those that impose cognitive strain on the decision maker, trigger simplifying strategies, such as a dimension-based search. The unfamiliar choice set imposed such a strain on the decision maker (p. 20).

Because the available alternatives were unfamiliar to even the experienced decision makers, their reliance on prior information obtained was limited. Therefore, one plausible explanation of this is that there is a tendency to rely on whatever processes are familiar, and those usually involve short-cuts. Decisions which are unfamiliar require more cognitive strain and the natural inclination of the decision maker is to employ heuristics to lessen the strain (Sniderman, Brody, and Tetlock 1991; Klein 1989).

Moreover, the subjects' lack of familiarity with the alternatives possibly increased the difficulty of differentiating among them. These difficulties explain why decision makers facing unfamiliar alternatives frequently use dimensional processing.

Decision Structure, Strategy and Choice: In addition to strategy selection, there was a focus on whether changes in the choice set affect not only the decision strategy by which subjects deal with the information, but also the choices that they eventually make. It should be recalled that all the subjects faced a decision matrix that consisted of the same value structure. Moreover, the value structure of the matrix (V_{ij}) 'defined' alternative A4 as the alternative with the highest cumulative score (highest utility). Hence, one could expect that this alternative would be chosen across all conditions by all types of decision makers.

Table 1 shows the frequency in which each of the alternatives was chosen as a function of the structure of the choice set and its familiarity. The interesting finding that emerges in the analysis of this table is that the Air Force Commanders' choices were largely unaffected by the structure of the choice set.

Table 1. Combined effects of dynamic vs. static choice sets and familiar and unfamiliar sets on percentage of Air Force Commanders choosing a particular alternative

	Alternatives				
	A1	A2	A3	A4	
Unfamiliar Choice Set Dynamic	9.09	27.27	9.09	54.55	100%
Static	0.00	9.09	36.36	54.55	100%
Familiar Choice Set Dynamic	27.27	0.00	54.55	18.18	100%
Static	27.27	9.09	27.27	36.36	100%

Reported in Mintz, Geva, Redd, and Carnes 1995.

Whether the optimal alternative (A4) was displayed during the entire decision process, or appeared after the decision makers had already entertained information about three other alternatives, the structure of the choice set did not affect the likelihood of its choice. The influence of the structure of the choice set and the familiarity of the alternatives on the selected alternative is broken down in Table 2-a and Table 2-b.

Table 2-a. The impact of static vs. dynamic choice sets on choice (Air Force Commanders)

	Alternatives				
	A1	A2	A3	A4	
Dynamic Structure	18.18	13.64	31.82	36.36	100%
Static Structure	13.04	8.70	30.43	47.83	100%

Table 2-b. The impact of familiar and unfamiliar choice sets on choice (Air Force Commanders)

	Alternatives				
	A1	A2	A3	A4	
Familiar Choice Set	26.09	4.35	39.13	30.43	100%
Unfamiliar Choice Set	4.55	18.18	22.73	54.55	100%

Another interesting variable was the selection of the optimal alternative or the alternative with the highest utility. The influence of the structure of the choice set and the familiarity of the alternatives on the probability of the optimal alternative being chosen is significant. In this study, it was found that 42% of the officers selected the 'optimal' alternative irrespective of the dynamic or static nature of the choice set (see Table 2-a and Table 2-b). On the other hand, the familiarity with the alternatives of the choice-set significantly affected the selection of alternatives, $X^2(3)=8.52$ $p<.05$. The most popular alternative in the familiar choice set was "sanctions" (A3), and not the

'optimal' option (A4). In contrast, in the tests involving the unfamiliar choice set, the 'optimal' alternative (A4), was the most popular choice. Table 3 presents these results. These findings seem to reflect the 'preference over preference' phenomenon, where *a priori* evaluations of alternatives dilute the impact of new information (see also Gilliland et al. 1994). Note that in the unfamiliar scenario, the experienced decision makers opened an average of 12.8 information bins, whereas in the familiar scenario an average of 11.1 information bins were opened. Presumably, in the unfamiliar scenario, decision makers needed to gather more information in order to make their decision, yet in the familiar scenario, they were able to use prior knowledge to reach a conclusion.

Table 3. Impact of dynamic vs. static choice sets and familiar and unfamiliar sets on selections of a "target" (optimal) alternative (Air Force Commanders)

	Dynamic	Static	Total
Familiar Choice Set	33.33	66.67	100.00%
Unfamiliar Choice Set	50.00	50.00	100.00%

This study was also replicated with cadets from the Corps of Cadets at Texas A&M University. While it is expected that the basic pattern of results may be similar to the case of the experienced decision makers, there is an assumption that the difference in experience in decision making on national security issues between various groups of

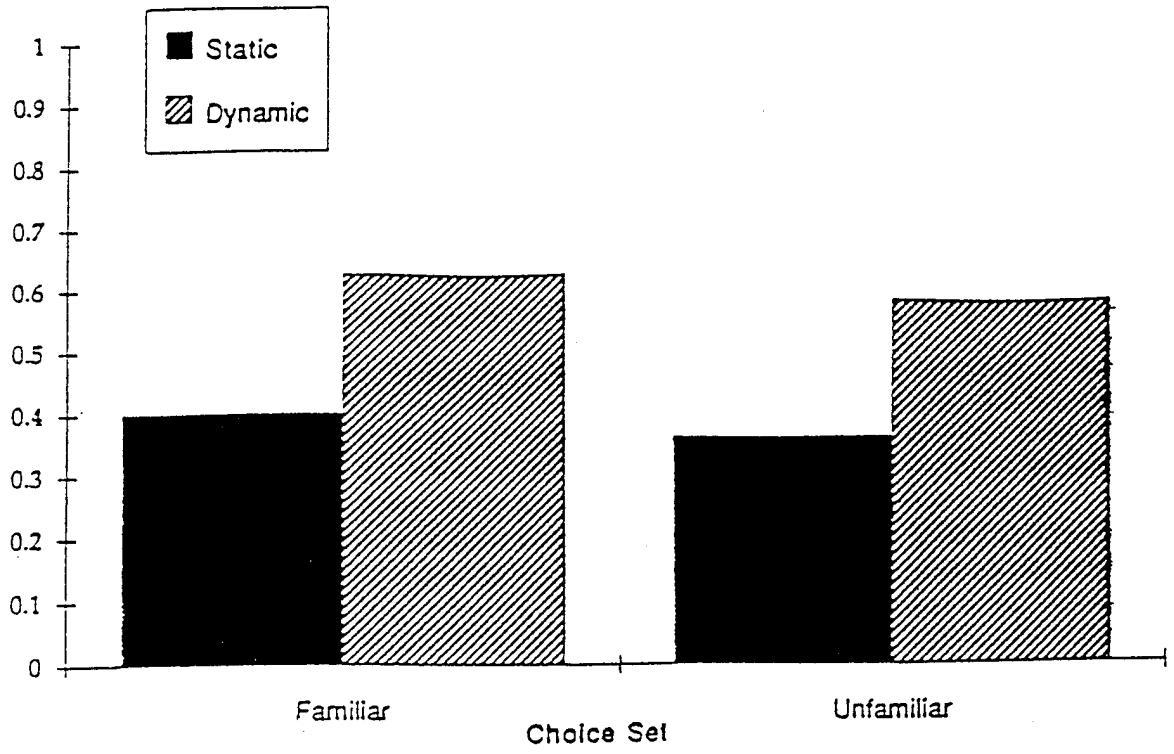
decision makers will be reflected in the results recorded by the decision board platform. In testing the hypothesis that different strategies are employed by experienced decision makers as opposed to those selected by inexperienced decision makers, this group of "semi-experienced" decision makers was tested as well. As Klein notes "experienced decision makers deliberate more than novices about the nature of the situation, whereas novices deliberate more than experts about which response to select" (1989: 59).

Study 2: The Corps of Cadets as Foreign Policy Decision Makers

Fifty three cadets from the Corps of Cadets at Texas A&M University participated in this study. All of the previous experimental conditions existed for this study as well.

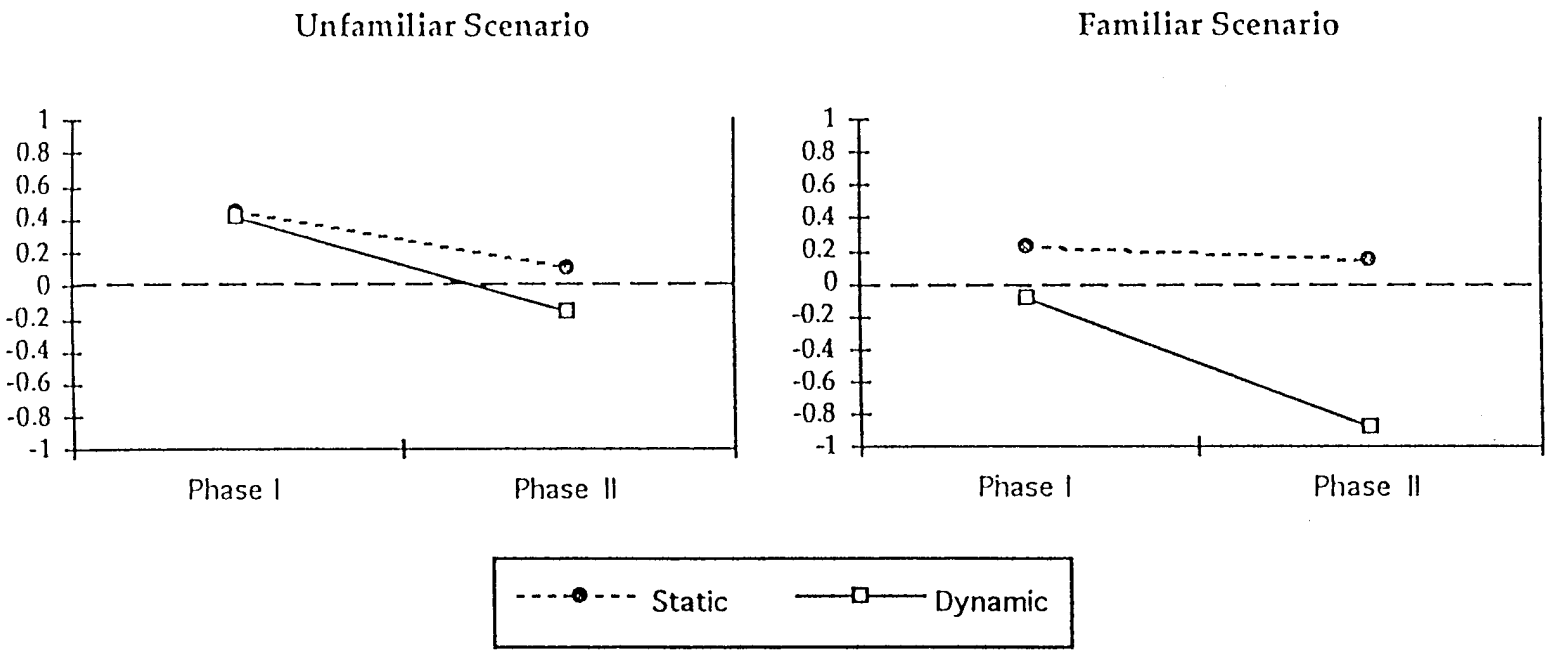
Information Search Index: As in the previous experiment the Search Index (SI) of Billings and Scherer (1988) was used to denote the decision strategy employed by the subjects. To test the dynamic structure, the frequency of subjects who changed their strategy between the two phases in the experiment was calculated. Figure 6 presents the proportion of subjects that changed their decision strategy between the two phases.

Figure 6. Proportion of Corps Cadets changing processing strategy as a function of dynamic vs. static choice set and the familiarity of choice set



These findings suggest that in the dynamic choice set 60% of the subjects changed their decision strategy during the information search. These findings also suggest that only 38% of the subjects changed their decision strategy when they faced a situation involving static choice sets. This difference is statistically significant by the z test for proportions (Langer and Abelson 1972) ($z=1.42$ $p<.05$). This indicates that as in the case of experienced decision makers, semi-experienced decision makers change their strategies when they are gathering information after a new alternative surfaces. Again, to understand how different strategies are used during different phases of the decision making process a 2x2x2 split-plot ANOVA was conducted on the SI scores of the two phases. The findings are presented in Figure 7. It appears that the semi-experienced decision makers began with an information search pattern utilizing an alternative-based strategy and shifted to a dimension-based strategy as the task proceeded. This is in direct contrast to the results of the experienced decision makers. The Air Force Commanders tended to begin with a dimension-based information search and then switched to an alternative-based search after the fourth alternative appeared. One plausible explanation for the difference in results is the level of experience of each type of decision maker.

Figure 7. SI scores of Corps Cadets for the two phases of data acquisition as a function of dynamic vs. static and familiar and unfamiliar choice sets



For the first information search pattern there was a trend, that in the unfamiliar scenario, the information search was more alternative-based (M=.45) than in the familiar scenario (M=.12). In the second phase of the information search, the dynamic structures were more frequently dimension-based (M=-.42) than in the static structure (M=.11). This was significant at $F(1,44)=7.80 p<.01$.

These results seem to contradict many of the findings previously presented concerning the decision board simulator using experienced decision makers. Although it has previously been reported that decision makers will choose to screen alternatives using a dimension-based process and then as the number of alternatives is reduced then they employ a more alternative-based approach (Mintz, Geva, and Redd 1994), these results are not in accordance with those findings or with the case of the experienced decision makers.

It does follow that the unfamiliar choice set imposed a more difficult task to the semi-experienced decision makers. In the unfamiliar scenario of where to locate a naval base, significantly more information bins were opened (M=13.92) than in the familiar scenario (M=10.33). This was statistically significant at $F(1,44) =19.22$ $p<.0001$. Understanding why decision makers would opt for the dimension-based strategy when they are unfamiliar with the alternatives is fairly easy. The alternatives are unfamiliar, but the dimensions are relatively familiar. Therefore, in the effort to simplify the decision task, and to ease the cognitive strain, decision makers tend to employ heuristics. They will follow a pattern they are familiar with and in this case they use a

dimension-based pattern. To understand why these subjects would choose a more dimension based approach at first and then switch to an alternative based approach is not as easy. It is possible that these subjects emphasized the need to gain an overall feel for what advice was being given by the advisors and then as the task proceeded, the challenge was to decide between alternatives rather than the dimensions.

Decision Structure, Strategy and Choice: Another area of interest is how the choice sets affect the ultimate outcome of the decision. In both scenarios and in all the experiments done thus far, the subjects faced a decision matrix with the same conditions as the experiment with the experienced decision makers.

The frequency with which each alternative was chosen as a function of the choice and the familiarity of the scenario is reported in Table 4. These findings reveal that for (semi-experienced) Texas A& M cadets, both the structure of the choice set and the familiarity of the alternatives affected the alternative chosen. However, in both the familiar and unfamiliar scenarios for the (experienced) Air Force Officers, there was much less distinction between the dynamic and static structures of the choice set. This again may possibly be attributed to the level of decision making experience held by each group of decision makers. The experienced decision makers were not as affected by the emergence of another alternative in the middle of the crisis. Presumably their high level of decision making experience was able to negate the confusion and cognitive strain placed on the decision maker by the emergence of a new alternative and thus the

differing results.

Table 4. Combined effects of dynamic vs. static choice sets and familiar and unfamiliar sets on percentage of Corps Cadets choosing a particular alternative

	Alternatives				
	A1	A2	A3	A4	
Unfamiliar Choice Set Dynamic	33.33	8.33	33.33	25.00	100%
Static	25.00	0.00	41.67	33.33	100%
Familiar Choice Set Dynamic	25.00	16.67	0.00	58.33	100%
Static	0.00	25.00	25.00	50.00	100%

It should be noted that in the unfamiliar scenario, they did choose the optimal alternative more often. This could be largely due to the fact that they did not have *a priori* information about the naval bases and therefore had to rely on the adviser's statements and the numerical values to determine the utility of those alternatives. These results are similar to those recorded by the Air Force Officers. However, in the familiar situation

where the decision maker was required to make a decision about the use of force, a situation many military personnel are familiar with, the semi-experienced decision makers did not choose the fourth alternative as often. A plausible explanation for this finding is that choosing the alternative with the highest utility was not the goal of the semi-experienced decision makers. Possibly their lack of experience with decision making limited their selection of strategies and they were not as concerned with selecting the "optimal" choice. When we break the findings down to look simply at the effect of the dynamic and the static structure on the choice set, it is clear that the structure does not influence the decision maker nearly as much as the familiarity or unfamiliarity of the scenario. This is an interesting finding and adds to the reliability of the Decision Board Platform as it is compatible with many of the previous findings using other groups of subjects (Mintz, Geva, and Redd 1994; Mintz, Geva, Redd, and Carnes 1995). This break down in the findings is presented in Table 5-a and 5-b.

Table 5-a. The impact of static vs. dynamic choice sets on choice (Corps Cadets)

	Alternatives				
	A1	A2	A3	A4	
Dynamic Structure	29.17	12.50	16.67	50.00	100%
Static Structure	12.50	0.00	33.33	50.00	100%

Table 5-b. The impact of familiar and unfamiliar choice sets on choice (Corps Cadets)

	Alternatives				
	A1	A2	A3	A4	
Familiar Choice Set	29.17	4.17	37.50	29.17	100%
Unfamiliar Choice Set	12.50	20.83	12.50	54.17	100%

In these cases it seems that possibly, the decision maker had *a priori* information and was not as concerned about choosing the highest utility option. Presumably, the time constraint and the familiarity with the alternatives encouraged the decision maker to "satisfice" rather than seek the 'optimal solution'. It is also possible that their predispositions affected their choice. The significant impact of the decision to use force often reduces this option to a "last resort". Therefore, even though in this case it was the option with the highest utility, the decision maker chose to select a less aggressive alternative. The impact of dynamic and static choice sets and familiar and unfamiliar sets on selection of an optimal alternative as found by the Corps of Cadets is presented in Table 6.

Table 6. Impact of dynamic vs. static choice sets and familiar and unfamiliar sets on selections of a "target" (optimal) alternative (Corps Cadets)

	Dynamic	Static	Total
Familiar Choice Set	25.00	75.00	100.00%
Unfamiliar Choice Set	45.46	54.54	100.00%

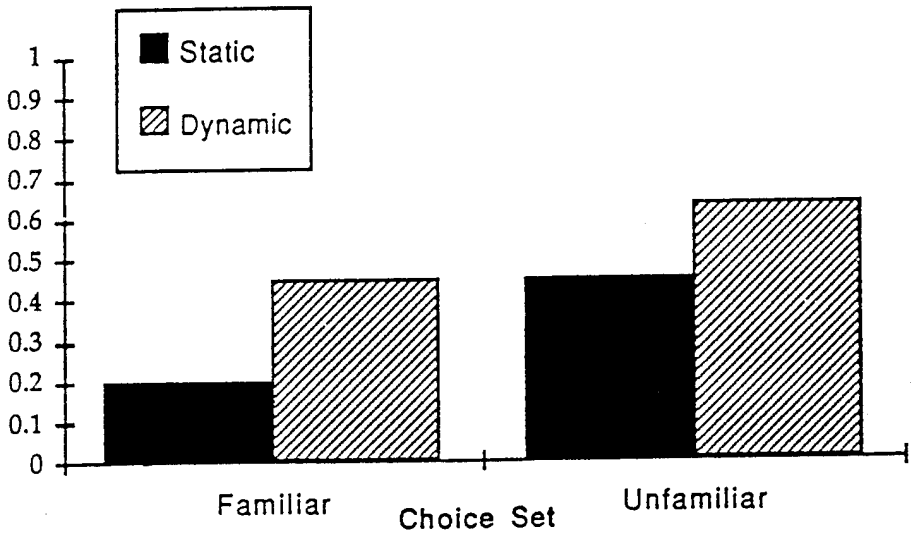
Study 3: Undergraduate Students as Foreign Policy Decision Makers

Eighty students participated in this experiment, the results of which were initially presented in Mintz, Geva, and Redd, 1994, but nevertheless, serve as a valid tool to use in comparison with the experiments done using Officers and Texas A&M cadets. The data collection was not a part of this study, and the results presented are those of Mintz, Geva, and Redd 1994. The subjects for this experiment were also awarded the four dollar prize for making the "right" decision.

Information Search Index: The findings in this experiment show on non-experienced decision makers that in the test involving the dynamic choice set 54% of the subjects changed their decision strategy during the information search, while only 35% of the subjects changed their decision strategy when they faced a static matrix. These results were remarkably similar to the results obtained by the Air Force Commanders (55% vs. 32%) and are statistically significant by the z test for proportion (Langer and Abelson 1972) ($z=1.76$ $p<.05$). They are presented in Figure 8. Interestingly, this strategy change was more evident in decisions of an unfamiliar choice set than in decisions presenting the decision maker with a familiar choice set ($z=2.21$ $p<.05$). The results replicate the findings reported concerning the Air Force Officers and strengthen the claim presented by Mintz, Geva, and Redd (1994) that decision makers change their information processing strategies in dynamic situations.

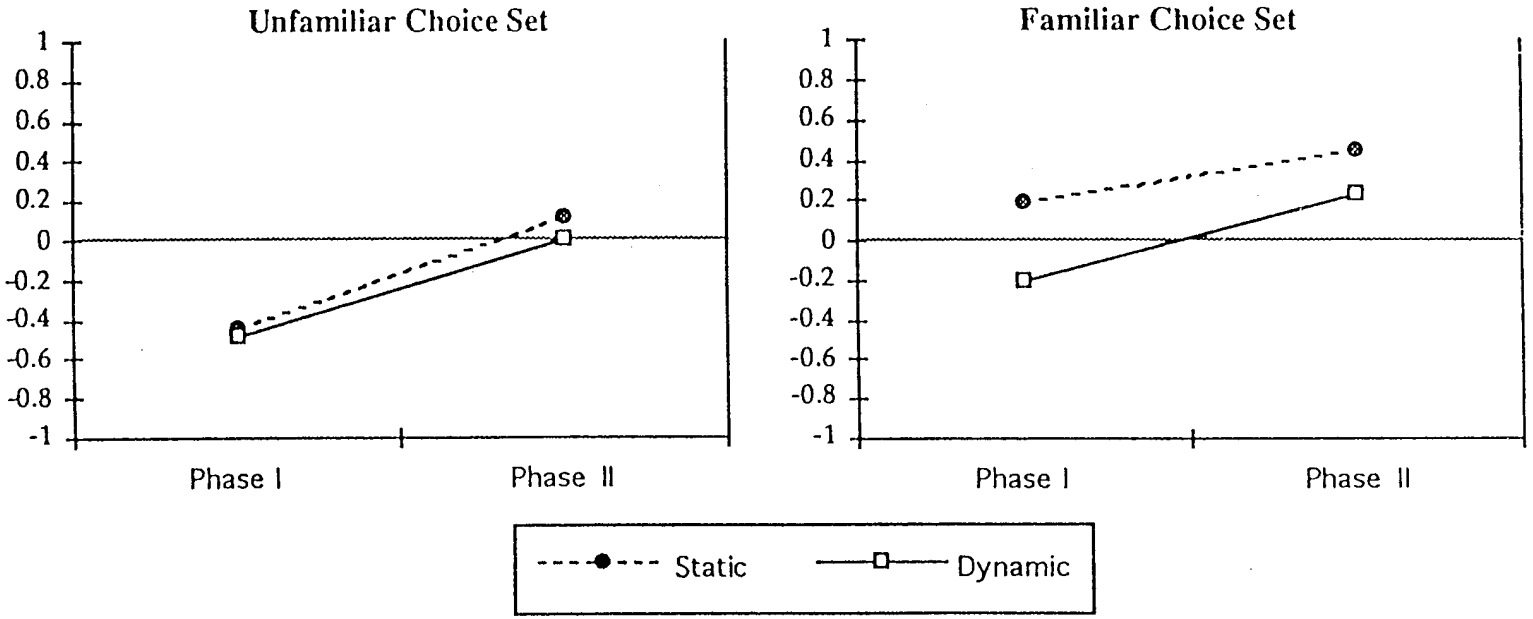
The 2x2x2 split-plot ANOVA on the SI scores of the two phases of the decision processes show that decision makers tend to begin the information search utilizing a dimension-based strategy, and then, as the task proceeds, shift toward an alternative-based strategy. The difference between the SI at phases I ($M=.23$) and the SI at phase II ($M=.20$) is again significant, $F(1,76)=7.08$ $p<.0001$. This trend is compatible with the performance of the experienced decision makers (Air Force officers) in Study I but does not follow as closely to the results presented in Study II with the Corps of Cadets. The results are presented in Figure 9.

Figure 8. Proportion of Undergraduate Students changing processing strategy as a function of dynamic vs. static choice set and the familiarity of the choice set



Source: Mintz, Geva and Redd 1994

Figure 9. SI scores of Undergraduate Students for the two phases of data acquisition as a function of dynamic vs. static and familiar and unfamiliar choice sets



With the non-experienced experimental groups there was again a strong main effect for the familiarity factor $F(1,76)=5.32$ $p<.04$. That is, the unfamiliar choice set led to a more dimension-based pattern of processing ($M=-.20$) than the familiar choice set ($M=.17$). This result is consistent with the findings in Study I. However, there were some differences with this group of "inexperienced" decision makers, as the shifts in decision strategy during the process were not affected by the familiarity of the choice set. The undergraduate students were presumed to be "inexperienced" in terms of decision making because of their relative age and lack of institutionalized leadership experienced compared with the Air Force Officers. This departure from the results of Study I can be explained in light of several studies that address the effects of expertise on strategies of decision making (see Fiske et al. 1983; Klein 1989). These studies showed that experienced decision makers differ from inexperienced decision makers mainly in their initial interpretation of the decision matrix and its demands (Mintz and Geva 1994). Experienced decision makers are more sensitive to the familiarity of the decision task to previous decisions than novice decision makers, and this difference is reflected in their decision process. The Foreign Policy Decision Board Platform reveals these differences and these tests increase the validity of this research platform. The results from the third study pertaining to strategy selection support the proposition concerning the use of simplifying strategies (heuristics), such as a dimension-based search, under cognitive-laden situations.

Structure, Strategy, and Choice among inexperienced decision makers: The choices of members of this group are presented in Table 7. These findings show the frequency in which each of the alternatives was chosen as a function of the structure of the choice set (across the two scenarios). The Chi Square test ($X^2(3)=8.31$ $P<.05$) is significant and implies that the structure of the choice set affects the choice. While in both the dynamic and static structures the most 'popular' alternative was A3, a higher proportion of subjects selected the later appearing alternative (A4) in the static set, as compared with the case where that alternative (A4) appeared after a certain amount of information processing had already been completed. This finding expresses the 'sunk cost' phenomenon (Mintz, Geva, and Redd 1994: 21). "Subjects who invested energy and time in exploring the first three alternatives are reluctant to opt for the 'newcomer' alternative. This pattern emerged despite the fact that the fourth alternative was designated (value wise) as the best one" (ibid). The conclusion then is that for inexperienced decision makers, it is easier to identify an optimal alternative in a static decision matrix than in a dynamic structure. These findings are presented in Table 8-a.

Table 7. Combined effects of dynamic vs. static choice sets and familiar and unfamiliar sets on percentage of Undergraduate Students choosing a particular alternative

	Alternatives				
	A1	A2	A3	A4	
Unfamiliar Choice Set Dynamic	15.79	36.84	31.58	15.79	100%
Static	22.22	5.56	11.11	61.11	100%
Familiar Choice Set Dynamic	25.00	10.00	35.00	30.00	100%
Static	10.00	0.00	75.00	15.00	100%

The familiarity of the choice sets was also significantly related to the selection of alternatives, X^2 (3)=11.12 $p<.02$. Table 8-b "shows that the most popular alternatives in the familiar choice set was 'Sanctions,' and not the 'optimal' choice ("Use of Force"). In contrast, in the Unfamiliar choice set, the 'optimal' alternative, A4, was the most popular choice" (Mintz, Geva, and Redd 1994: 22). These findings replicate the results of Study I and seem to reflect the 'preference over preference' phenomenon, where an *a priori* preference for an alternative over other alternatives dilutes the impact of new information (ibid).

Table 8-a. The impact of static vs. dynamic choice sets on choice (Undergraduate Students)

	Alternatives				
	A1	A2	A3	A4	
Dynamic Structure	19.33	23.67	33.33	23.67	100%
Static Structure	15.79	2.63	44.74	36.84	100%

Table 8-b. The impact of familiar and unfamiliar choice sets on choice (Undergraduate Students)

	Alternatives				
	A1	A2	A3	A4	
Familiar Choice Set	17.50	5.00	55.00	22.50	100%
Unfamiliar Choice Set	18.92	21.62	21.62	37.84	100%

Comparing the results of the experienced, semi-experienced and inexperienced decision makers reveals that 1) all groups are affected by the familiarity of the alternatives in the choice sets. However, the experienced decision makers were more apt than their inexperienced counterparts to adjust their decision strategies to the different decision environments (i.e., different combinations of familiar/unfamiliar and static/dynamic choice sets) and therefore 2) were less affected by the structure of the choice set.

Finally, Table 9 illustrates the proportion of subjects choosing the 'optimal' alternative as a function of the structure of the choice set and the familiarity of the

participants with the alternatives. The Chi square test (X^2 (1)=4.71 p<.05) shows a significant interaction between these two variables. While in the Unfamiliar choice set a static presentation of the alternatives increased the likelihood of choosing the optimal alternatives (78.56% vs. 21.44%), in the Familiar set we observe an opposite trend, i.e. in the dynamic presentation 66.67% of the subjects selected the 'optimal' alternative compared with 33.33% in the static condition.

Table 9. Impact of dynamic vs. static choice sets and familiar and unfamiliar sets on selections of a "target" (optimal) alternative (Undergraduate Students)

	Dynamic	Static	Total
Familiar Choice Set	66.67	33.33	100.00%
Unfamiliar Choice Set	21.44	78.56	100.00%

CONCLUSIONS

Understanding the decision making strategy employed by decision makers is crucial to the study of how foreign policy is made. A clear assessment of the process is necessary to dissect any aspects of the final outcome in foreign policy decision making. Studying this complicated process in a laboratory is difficult, yet the aid of computers significantly increases the ability to create real-world situations in a laboratory environment. The Foreign Policy Decision Board Simulator is used to gain valuable information about the strategies decision makers employ and the influences on the ultimate choice. Experimental research is beneficial and necessary for this type of study, however, it also creates many problems such as trying to duplicate realistic behavior in a laboratory concerning real-world events. Replicating the experiment is essential to test for reliability and to enhance external validity. When the experiment is replicated with various groups over time, the combination of results provide a robust source of data in which to prove or disprove the theory.

The variance in the level of experience of the decision makers is essential to understanding foreign policy decision making. Establishing a method by which information is gathered and decisions are made appears to be largely a factor of the experience of the decision maker. In doing social cognition research, Fiske, et al note, " if we are going to take seriously real world social knowledge domains, we will have to deal with the variations in prior knowledge that our subjects bring to the lab with them"

(1983: 97). The purpose of this study is to bring subjects with various levels of decision making experience to the laboratory. Understanding how different decision makers process information en route to making a decision is crucial in evaluating and improving the nature of the decisions being made and the efficiency of the process.

The findings certainly are compatible with the hypothesis that different decision rules and strategies are used when the subjects are familiar and unfamiliar with the choice set. In addition, the presentation of the choices (i.e. whether they are static or dynamic) also affects the decision strategy used. Furthermore, the level of experience of the decision maker in terms of their operational training and knowledge in making critical decisions affects the decision strategy used in various situations. This study was able to illuminate some of the differences among strategies used by decision makers depending on their particular task.

It is possible that the (experienced) Air Force Commanders had a larger "information base" than the other groups of decision makers and they were able to use their own previously acquired knowledge to evaluate the alternatives. They did, however, adopt a heuristic, dimension-based strategy when they were unfamiliar with those alternatives and were not able to or chose not to rely as heavily on *a priori* knowledge. The results from the (semi-experienced) Corps Cadets indicate that this group of subjects initially approached the task of making a decision with a dimension-based strategy, and then as the task proceeded and alternatives were added, an alternative-based strategy was used. Their initial use of a dimension-based strategy

indicates the need to lessen the cognitive strain as the decision maker tried to organize the information obtained. They needed to gain an understanding for the complexity of the decision task, and then as the task proceeded, the challenge was narrowed to deciding between alternatives.

Finally, for the studies with the (inexperienced) undergraduate students, when unfamiliar with the alternatives, they began by using heuristics to reduce the complexity of the task. They used a dimension-based strategy to narrow the acceptability of the options. In addition, the undergraduate students were affected more by the structure of the choice set than were the military officers and the Texas A&M cadets. This result reveals the effect of inexperience on decision makers. These results are indicative of the impact experience level, familiarity of the choice set, and structure have on the strategies used during the decision making process.

These results confirmed many of the previous results in understanding the choice each of the decision makers selected in the various decision structures. When all types of decision makers were unfamiliar with the scenario, the highest utility choice was selected. When they were more familiar with the alternatives, they were not so inclined to select the highest utility choice, but rather chose an alternative best suited to their predispositions. Using military personnel is very valuable in learning about decision making processes as they are very often top national security or foreign policy advisors in the government. The military personnel are also provided continuous opportunities to make decisions. They operate in a very different environment which calls for

necessary conditions to be met often in a limited amount of time. Once these conditions are met, the decision making process has ended. As Klein concludes "once a decision maker identifies the typical action, there is usually a step of imagining what will happen if the action is carried out in this situation. If any pitfalls are imagined, then the decision maker will try to modify the action. If that does not work, the officer jettisons it and thinks about the next most typical action . . . the experienced decision makers are searching for the best option. They only want to find one that works" (1989: 61). This satisficing principle is one of the parameters of the poliheuristic theory of foreign policy decision making. This also reflects the differences of goals in decision making with leaders of various levels of decision making experience. Understanding these differences, by simulating many variables, and decision conditions, including previous decision making experience, will continue to contribute to the study of decision making and our understanding of how and why certain decisions may be made under certain conditions.

The contribution of this study is the test of the poliheuristic theory with groups of subjects with various levels of decision making experience. The Decision Board Platform as a means to understand the strategies selected by decision makers when faced with familiar and unfamiliar scenarios and static and dynamic choice sets, is relatively new. The repetition of its use with various groups of subjects is critical in assuring its reliability. It should be noted that because the nature of the decision contained within the decision board is content free, this device could be used to study

decision making in various disciplines. It is a useful tool that illuminated some interesting points about strategy selection in the decision making process. Understanding these decision making processes could potentially impact the study of behavior of the world leaders and also aid in predicting possible outcomes for future decisions.

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