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**Cognitive Simplification Processes in Strategic
Decision-Making: Insights from Behavioral
Decision Theory and Cognitive Psychology**

Charles R. Schwenk

College of Commerce and Business Administration
Bureau of Economic and Business Research
University of Illinois, Urbana-Champaign

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Charles R. Schwenk, Assistant Professor
Department of Business Administration

COGNITIVE SIMPLIFICATION PROCESSES
IN STRATEGIC DECISION-MAKING: INSIGHTS FROM
BEHAVIORAL DECISION THEORY AND COGNITIVE PSYCHOLOGY

Strategic decision-making can be viewed as a special kind of decision-making under uncertainty. Such decision-making involves the activities of goal formulation, problem identification, alternatives generation, and evaluation/selection. Researchers in cognitive psychology and behavioral decision theory have identified a number of cognitive simplification processes which may effect the way decision-makers to perform these tasks. Within this paper, the research on these processes is summarized and their possible effects on strategic decision-making are discussed. Implications for future research in this area are also drawn.

INTRODUCTION

Those responsible for formulating an organization's strategy face a task of extreme complexity and ambiguity. Though the complexity of the task may appear almost infinite, human information processing capacity is limited. Writers in the field of strategic management generally recognize that human cognitive limitations may affect strategic decision-making (Steiner and Miner, 1977: 226-231), basing their arguments on Simon's (1976) notion of "bounded rationality." However, they have not discussed the specific effects of bounded rationality on decision-maker's perceptions or behavior.

Cognitive psychologists and behavioral decision theorists, on the other hand, have identified a wide range of cognitive processes which serve to simplify decision-maker's perceptions of problems. Their research provides the basis for tentative propositions about the ways strategic decision-makers process information and how bounded rationality affects decision outcomes at each stage of the strategic decision-making process.

Characteristics of Strategic Decision-Making

One of the central features of strategic decisions is their lack of structure (Mintzberg, Raisinghani, and Theoret, 1976). Mintzberg et al. state that the strategic decision process is characterized by novelty, complexity, and openendedness. Decision-makers usually begin with little comprehension of the situation and their understanding deepens as they work on the problem (1976: 265). Mason and Mitroff (1981: 10-13) observe that the lack of structure in strategic decision-making is due to the complexity of strategic problems. They state that strategic problems

have no clear formulation and that it is extremely difficult to describe the problem and to determine the criteria by which solutions should be judged. Complex problems involve uncertainty and ambiguity for decision-makers.

Michaels suggests that when environmental uncertainty cannot be minimized by organizational action, managers may alter their perceptions of the environment so that it appears more certain. This happens because the psychological state of uncertainty regarding an important decision is very painful. Hence, decision-makers may repress awareness of the uncertainty and act on a simplified model of reality which they construct (Michaels, (1973: 31)). In order to be able to act at all in such environments, decision-makers may use perceptual processes to simplify the decision situation.

This paper develops conjectures about simplification processes in strategic decision-making by drawing on literature in the fields of cognitive psychology and behavioral decision theory dealing with problem formulation and decision-making under uncertainty. Researchers in these fields often call these processes biases. However, others prefer the term "heuristics" since the term "biases" suggests that these processes generally have a negative impact on strategic decisions. Tversky and Kahneman (1974), Winkler and Murphy (1973), and other behavioral decision theorists have pointed out that they may actually improve decisions. As Tversky and Kahneman (1974: 1125) state, "In general, these heuristics are quite useful, but sometimes they lead to severe and systematic errors." The purpose of discussing the possible operation of these processes in strategic decision-making is not to criticize the quality of most strategic

decision-making but rather to generate ideas about the ways decision-makers actually deal with complexity, ambiguity, and uncertainty.

COGNITIVE SIMPLIFICATION PROCESSES IN STRATEGIC DECISION-MAKING

Extensive lists of cognitive simplification processes have already been developed and examples can be found in reviews by Hogarth (1980); Hogarth and Makridakis (1981); Slovic, Fischhoff, and Lichtenstein (1977); Taylor (1975); and Tversky and Kahneman (1974). From these reviews, a small set of simplification processes has been selected for discussion in the context of strategic decision-making. The discussion is restricted to those processes which have been demonstrated in laboratory settings and for which possible examples could be found in field settings. Some of these field examples have been identified by the researchers who discuss the simplification processes. Others have been identified by the author from public descriptions of business decisions.

The use of both laboratory and field support is considered necessary because it has been suggested that neither laboratory nor field evidence alone is sufficient to demonstrate the existence of these processes in strategic decision-making. There are those who argue that we cannot draw inferences about executives' performance at real world decision-making from students and laboratory decision-making tasks (Ungson, Braunstein, & Hall, 1981). They hold that extensive experience with a variety of complex decisions produces high-quality decision-making performances in executives which is relatively free from bias. In support of this claim, evidence suggests that some groups of professional decision-makers such as weather forecasters make good use of statistical information in forecasting and do not exhibit a high degree of decisional bias (Hogarth,

1975: 277-278). However, these decision-makers are able to learn from their mistakes and improve their performance over time because they are required to make numerous predictions based on clearly identified data and receive continuous unambiguous feedback soon after they make their predictions (Hogarth, 1975: 278; Nisbett & Ross, 1980: 265).

It could be argued that none of these conditions hold in strategic decision-making. Strategic decisions occur relatively infrequently and involve ambiguous data and possible disagreement about which data are relevant. Further, the feedback about the success of the strategy is often ambiguous since there may be multiple evaluation criteria, and evaluation data may not be available for years after implementation. However, the suspicion of laboratory results is appropriate. Laboratory experiments merely demonstrate the existence of individual simplification processes which may not operate in organizational contexts. In the conclusion of this paper, group characteristics which should increase the impact of individual biases on organizational decisions are discussed.

Others criticize the attempt to document simplification processes through the use of data on actual organizational decisions collected after the decisions have been made. This data is typically collected through interviews with key decision-makers and examination of organizational documents and records related to the decision. As Kinder and Weiss state, "such documents may reveal more about the politics of the decision setting than about individual decision processes" (1978: 726-727).

The focus on simplification processes for which laboratory and field support exists should increase the chance of identifying cognitive processes which really do affect organizational decisions rather than

processes produced only by the artificiality of the laboratory context or the political processes in organizations. The laboratory and field evidence is not offered as proof that these simplification processes exist but rather as a basis for selecting processes which have some probability of effecting decision-making. These are then used as a basis for generating propositions about the ways in which cognitive simplification may affect strategic decision-making. These are listed later in the "Propositions" section of the paper.

Simplification Processes and the Stages of Strategic Decision-Making

Numerous descriptive models of the strategic decision-making process have been developed (see Mintzberg, Raisinghani, & Theoret 1976; Glueck 1976; Mazzolini, 1981; and Hofer & Schendel, 1978 for examples). These models involve various numbers of stages and are generally similar to earlier models of the organizational decision-making process (Lang, Dittrich, & White, 1978). In Table 1, four normative models are presented and a simplified model is derived which will provide the basis for the following discussion.

Insert Table 1 about here

As can be seen from Table 1, all of these models contain the activities of problem identification, alternatives generation, and evaluation/selection while some of them include implementation as a fourth activity.

In this section, selected cognitive simplification processes have been classified according to the strategic decision-making stage they may affect. Table 2 represents the three fundamental activities or stages in

the strategy formulation process and the cognitive processes which may operate during these three stages.

Insert Table 2 about here

Goal Formulation/Problem Identification

The importance of problem identification and goal formulation in strategic decision-making has recently been discussed by Lyles (1981), Lyles and Mitroff (1980), and Schwenk and Thomas (1982). In an early paper on organizational problem formulation, Pounds suggested that problem formulation begins with the recognition of gaps between expectations or standards and performance. From his observations of numerous decision processes, he determined that these standards may be based on past trends, projected trends, standards in other organizations, expectations of others, and theoretical models (Pounds, 1969).

Mintzberg et al. (1976) suggest that problem identification in strategic decision-making consists of two activities. The first is recognition, similar to Pounds' problem identification, and the second is diagnosis, where further information is collected to define the problem and its causes. During the recognition routine, problems or gaps must be identified in streams of ambiguous data from the environment. The authors suggest that the threshold or the point at which stimuli are interpreted as indicating a problem varies from manager to manager and within the same manager from one time to another. Diagnosis involves decisions about which type of information to collect in order to begin the process of problem solving (1976: 253).

In normative strategic decision-making models, the major purpose of information gathering in the beginning of the process is to identify gaps between objectives and performance. However, such gaps may indicate either random fluctuations or changes requiring revisions in strategy. Decision-makers' expectations may determine how such gaps are interpreted or even whether information on such gaps will be accepted and used. The following have been identified as cognitive processes which may affect problem identification: prior hypothesis bias, adjustment and anchoring, escalating commitment, and reasoning by analogy (see Table 2).

Prior Hypothesis Bias. Researchers have identified a simplification process which may lead decision-makers to ignore or misinterpret information. Levine (1971), Pruitt (1961) and Wason (1960) showed that individuals who formed erroneous beliefs or hypotheses about the relationship between variables tended to make decisions on the basis of these beliefs despite abundant evidence over numerous trials that they were wrong. Further, they sought and used information consistent with these hypotheses rather than disconfirming information. Koziellecki (1981: 241-242), in a series of laboratory experiments, showed that decision-makers overestimate the value of information which confirms their hypotheses and undervalue disconfirming information. Jervis (1976: 143-181) has also provided numerous examples from international relations of decision-makers' tendency to accept information which conforms to existing expectations and beliefs.

Under the effects of this process, decision-makers who believe that the company's current strategy is successful may ignore information suggesting gaps between performance and expectation. Conversely, those who believe it is failing may overweight information on such gaps.

Adjustment and Anchoring. Tversky and Kahneman (1974) discuss another process which may lead decision-makers to deny gaps. They call this the anchoring process. In strategic decision-making individuals must often make initial judgements about values of variables critical in particular decisions and revise these judgements as new data comes in. However, the adjustments are typically insufficient. Final estimates of values are biased toward the initial values. Individuals involved in the ongoing process of strategy formulation may attend to negative information about the success of present strategy but they may not make full use of it in revising their predictions of company performance under the present strategy. Under the influence of the anchoring process, their revisions may be smaller than are justified by the new information.

This process may be illustrated through the decision by the management of the Convair Company to continue development and production of their 880 aircraft in the late 1950's and early 1960's. Initial forecasts of sales and profits for the aircraft were very optimistic while it was in the design and testing stage. However, subsequent events which seemed to suggest a need to revise these forecasts (such as the failure of potential buyers to follow through on earlier purchase commitments) were not heeded (Smith, 1963: 63-96). Indeed, in a report to stockholders in the early part of 1960, a top company executive followed a report on huge cost overruns with the statement "we have every reason to believe [the 880 program] will be one of our most successful ventures" (Smith, 1963: 88).

Escalating Commitment. If the gap is recognized, some research suggests that decision-makers may deny its significance. That is, they may define the problem indicated by the gap as a minor one which does

not require a change in strategy. Researchers have found that once an individual commits significant resources to an investment project, he will tend to allocate more to the project if he receives feedback indicating that the project is failing than if he receives feedback indicating that it is succeeding. The feeling of personal responsibility for the project apparently induces decision-makers to remain with their chosen project in spite of evidence that it is not paying off (Staw, 1981). Fox and Staw (1979) found that escalating commitment was most likely to occur when decision-makers were vulnerable to job loss and when there was strong organizational resistance to the chosen course of action.

An excellent review of the laboratory experiments on escalating commitment is found in Staw (1981). In these experiments it is obvious that the decision-makers perceive the discrepancy indicating a project's failure since they allocate more money to projects which appeared to be failing. However, they do not use this perceived discrepancy to alert them to the need to change their strategy. Rather, they seemed to interpret the negative feedback as a signal that they should commit more funds to save the project.

Staw argues that the decisions of various American presidential administrations on successive escalations of the level of conflict in the Vietnam War represent the best examples of decisions influenced by this process. He suggests that once the United States committed large numbers of U.S. troops and heavy casualties were sustained, a process of escalating commitment was started which was very difficult to reverse (Staw, 1981: 577).

Duhaime (1981) also found some evidence for this bias in recent divestment decisions by a number of Fortune 500 firms. In some cases, unprofitable divisions with steadily mounting losses were held for years by the parent company and were divested only after the top level executive responsible for their acquisition had left the company.

Other research indicates a possible hypothesis which decision-makers may adopt to explain a perceived discrepancy in such a way that it appears to require no change in strategy. They may explain it as a result of chance factors rather than a result of a flaw in initial strategy. If they adopt this interpretation, they are likely to persist in the current course of action and escalate commitment to it. Staw and Ross (1978) found that subjects committed significantly more funds to a failing project when they believed the reason for the failure was extrinsic (a chance event which could not have been foreseen) than when the reason was seen to be intrinsic.

Reasoning by Analogy. Decision-makers may admit that the gap does exist and that it indicates a need to change current strategy. If this happens, there is at least one process which may help to determine the manner in which the problem will be defined. Steinbruner (1974) identified this process in his review of decision research in cognitive psychology and called it reasoning by analogy. Reasoning by analogy involves the application of simple analogies and images to guide problem definition. In strategic decision-making, it typically involves the application of analogies from simpler situations to complex strategic problems. This process helps to reduce the uncertainty perceived in the environment.

Reasoning by analogy has been shown to be effective in generating creative solutions to problems (Gordon, 1961; Huff, 1980). However in

strategic decisions, which involve a great deal of uncertainty and complexity, the use of simple analogies may mislead the decision-makers into an overly simplistic view of the situation (Steinbruner, 1974: 115).

When decision-makers use analogies to define problems, they may not recognize that there are critical differences between their analogies and the decision situations they face. That is, they may not objectively evaluate the extent to which their analogy is representative of their decision situation. The representativeness heuristic has been discussed by Tversky and Kahneman and will be covered in more detail in a later section of this paper. Tversky and Kahneman (1974: 1126) have cited a number of laboratory experiments in which representativeness influenced decision-makers' use of diagnostic information in making predictions. This same heuristic may operate in the use of analogies to define problems.

Images and analogies are very common in discussions of top level problems in businesses and government. In international relations, the image of falling dominoes helped shape American policy toward Southeast Asia (Steinbruner, 1974: 116). Business organizations and their problems are often defined using analogies to sports teams and well (or poorly) oiled machines.

In the early 1970's, the management of General Cinema was considering entering (through acquisition) another line of business in addition to their theater and soft-drink bottling operations. The acquisition candidate was seen by management in terms of the analogy of "the

third leg of a stool" supporting the company's high rates of return. This image or analogy suggested to company management that they enter a line of business not closely related to General Cinema's current businesses and influenced the type of acquisition candidates considered. They eventually entered an agreement with a furniture retailer to finance the development of a national chain of showrooms. This venture appeared more and more questionable as the retailer suffered increasing losses in the mid-1970's and was finally abandoned (Uyterhoeven, 1976).

Alternatives Generation

After the strategic problem has been defined, strategic alternatives must be generated for dealing with the problem. Mintzberg et al. suggest that solutions to strategic problems may either be found or developed. Initially, decision makers may search their memories or search actively within their organization for solutions. If search is not successful, solutions must be designed. The authors state that because of time pressures and expense only a single alternative is typically designed (Mintzberg et al., 1976: 255-256). Mazzolini confirms the insights of Mintzberg et al. and states that search for alternative solutions is constrained by routines, guidelines, and standard operating procedures such that only a single alternative typically emerges (Mazzolini, 1981: 89).

Based on an intensive study of several organizational decisions, Alexander (1979) concluded that too much closure during the problem definition phase may be the result of rigidly predetermined goals or prematurely specific diagnosis which may inhibit the emergence of potentially good alternatives. According to Alexander, a common feature of the decision processes he studied was "the rapid convergence of options,

both in number and in range, before the formal evaluation process ever began" (1979: 396). Further, creative alternatives tended to be among those eliminated. This elimination was based on "intuitively perceived and non-formalized constraints (which are applied) before any of the alternatives were elaborated to any extent which would enable formal evaluation of their prospective impacts or outcomes" (1979: 397). In some cases cognitive biases lead to a situation in which there is no search for alternatives; in which decision-makers focus on a single alternative and vigorously defend it as the only possible course of action.

Since the simplification processes discussed in this section tend to eliminate the search for alternatives, they could be considered in the evaluation stage. However, since alternatives generation is part of most normative models, these processes are discussed in terms of their limiting effects on alternatives generation. They include: single outcome calculation, inferences of impossibility, denying value trade-offs, and problem set (see Table 2).

Single Outcome Calculation. Steinbruner (1974) elaborates on Cyert and March's (1963) concept of problemistic search and applies it to individuals as well as organizations in his discussion of the process of single outcome calculations. Rather than attempting to specify all relevant values and goals and generate a number of alternative courses of action as normative decision theory would suggest, decision-makers under the effects of this process may focus on a single one of their goals or values and a single alternative course of action for achieving it.

Steinbruner draws on the work of Festinger (1957) who conducted a series of laboratory experiments demonstrating the process of bolstering or developing arguments to magnify the attractiveness of a desired alternative in order to increase the "spread" of desirability between it and non-preferred alternatives. Janis and Mann (1977: 82-85) also discuss a number of more recent studies on the bolstering process.

Steinbruner argues that, contrary to normative models of organizational decision-making, uncertainty is often not resolved by probabilistic calculations of the outcomes of alternatives. Rather, favorable outcomes are inferred for preferred alternatives while unfavorable outcomes are projected for non-preferred alternatives. Thus strategic decision-making involves a single-valued problem and a single preferred alternative to which the decision-maker is committed from the outset of the decision process (1974: 122-123). This is an extremely powerful simplification process and is probably more likely to occur in highly complex and uncertain decision environments.

Inferences of Impossibility. Steinbruner suggests that decision-makers deal with non-preferred alternatives through inferences of impossibility. In contrast to the suggestions from normative decision theory, Steinbruner points out that decision-makers may devote a good deal of effort to identifying the negative aspects of non-preferred alternatives and attempting to convince themselves that they are not possible to implement (1974: 119). Since this forces premature rejection of alternatives, it may lead to a premature closure at the possible cost of rejecting the most feasible alternative.

Denying Value Tradeoffs. As both Steinbruner and Jervis have pointed out, decision-makers tend to over-value their favored alternative by denying

value tradeoffs (Steinbruner, 1974: 62-65; Jervis, 1976: 128-136). That is, they attempt to interpret facts in such a way that the favored alternative appears to serve several values simultaneously and appears to have no costs associated with it. They attempt to deny that there are tradeoffs and that there are some values which may not be served by their favored alternative.

Numerous examples of the operation of these three processes in international relations are given by Steinbruner. A business example is provided by Doweï in his description of Ford Motor Company, which lobbied (successfully) for eight years against Federal Motor Vehicle Safety Standard 301 which would have required them to redesign the gas tank of the Pinto. Ford's cost-benefit analysis showed that the redesign would not be profitable. Here, the cost-benefit analysis involved a single value or goal (profits) and Ford executives apparently considered only a single way of reaching that goal once it was challenged by potential legislation. This consisted of lobbying efforts against the proposed legislation (Doweï, 1977). Though there is no way to tell whether this single outcome calculation was supported by inferences of impossibility or the denial of value tradeoffs, the basic facts of the case suggest that decision-makers concentrated on a single outcome which indicates a high probability that these supporting biases came into play also.

Problem Set. Problem set is another decisional process which has been dealt with in laboratory research in cognitive psychology (Anderson & Johnson, 1966; Newell & Simon, 1972). Problem set is demonstrated when repeated use of one problem-solving strategy makes it more difficult to develop alternative strategies (Anderson & Johnson, 1966: 851).

Though this bias has only been experimentally demonstrated using relatively simple problem-solving tasks, a similar process may be operating when strategic decision-makers become strongly committed to a set of assumptions about the nature of their business and appropriate solutions to its problems. Mason and Mitroff (1981) have identified this rigidity of assumptions as a persistent problem in corporate strategy formulation. They provide detailed descriptions of business decisions in which strategies had been developed within the framework unexamined organizational assumptions. Through the application of techniques Mason and Mitroff had developed for questioning these assumptions and revising them where necessary, the decision-makers were able to improve the quality of their decision-making and the plans they produced.

Evaluation and Selection

From the preceding discussion it can be seen that the three activities of goal formulation/problem identification, alternatives generation, and evaluation/selection cannot be seen as distinct and unrelated parts of the strategic decision-making process. The previously cited research suggests that these activities are mutually dependent. The process of strategic decision-making is iterative and cyclical and errors at one "phase" may either be magnified or corrected by this cycling process. In some cases, the decision has essentially been made by the time it reaches the alternatives evaluation phase. Alternatives have been narrowed to a single one which is merely confirmed at this stage. Alexander suggested that when multiple alternatives are evaluated, "easily applied criteria without cumbersome data needs or complex judgemental demands get more weight" (1979: 398). Mintzberg et al.

make a similar point in their discussion of the screening of strategic alternatives (1976: 257).

If on the other hand, several alternative strategies are generated, these must be evaluated and the best alternative selected. The following discussion deals with cognitive processes which may affect the activities of evaluation and selection. These include: representativeness, the illusion of control, and devaluation of partially described alternatives.

Representativeness. Tversky and Kahneman (1974) have pointed out a cognitive process they call the representativeness bias which may lead to simplistic predictions of the consequences alternatives. It causes a decision-maker to overestimate the extent to which a situation or sample is representative of the situation or population to which he wishes to generalize. This process may be responsible for the fact that decision-makers tend to view strategic decisions in terms of simple analogies. It also causes them to overestimate the extent to which the past is representative of the present and the extent to which solutions offered for problems in the past will be of value in the present problem.

Part of this representativeness bias involves insensitivity to predictability. In making predictions of the effects of various courses of action decision-makers do not take into account the extent to which the evidence for the predictions is reliable, or the extent to which the criterion is related to the cues which they use to predict it (Tversky & Kahneman, 1974: 1125).

Decision-makers are also insensitive to sample size in making predictions. Though information about a large number of of past strategies would be necessary in order to make generalizations about the requirements

for a successful strategy, strategic decision-makers are often unable to collect data on a large number of past strategies and must generalize from a small data base. In this case, they tend to have too much confidence in their predictions from small amounts of data, feeling that these data are representative of the population as a whole. Tversky and Kahneman call this a belief in "law of small numbers" (Tversky & Kahneman, 1974: 1125). Nisbett and Ross (1980: 55-59) have suggested that decision-makers are especially susceptible to the law of small numbers when considering one or a few very vividly described cases. A single vivid description of a new venture's failure in a particular industry may influence the decision about entering the industry more than volumes of statistical data indicating high success rates in the industry.

Finally, in decision-making tasks which involve high levels of uncertainty, decision-makers should be aware of this uncertainty and of their inability to accurately forecast events in the decision environment. Their lack of ability to forecast outcomes should make them wary of becoming overcommitted to particular courses of action and should encourage them to develop contingency plans. However, decision-makers tend to be overly confident in their ability to predict outcomes (Tversky & Kahneman, 1974: 1129) which may perpetuate the illusion that their predictions are valid. Thus, they may not recognize the need to develop formal contingency plans. Einhorn and Hogarth (1978) call this overconfidence the illusion of validity.

Seawell Avery, as head of Montgomery Ward, believed that there would be a depression at the end of World War II. The basis for this belief was the fact that there had been such a depression after World

War I. His belief was so strong that it influenced his decision not to allow Ward to expand to meet competition from Sears. This decision led to a permanent loss of market share to Sears (Hartley, 1976: 8-9). This may be an example of the operation of this process of judgment by representativeness.

Another possible example is DuPont's attempt to develop and market Corofam from 1963 to 1971. Management's overconfidence in forecasts of technical and marketing expenses (which were about half of the actual costs) formed the basis of a very costly venture which DuPont had to abandon in April 1971 at a substantial loss. Overconfidence in forecasts may be the most common manifestation of this process (Hartley, 1976: 71-79).

Illusion of Control. This process, studied by Lefcourt (1973), Langer (1975), Langer and Roth (1975), and Larwood and Whittaker (1977) may also affect decision-makers' perceptions of the need for contingency plans. They may overestimate the extent to which the outcomes of a strategy are under their personal control and may assume that through additional effort they can make their strategy succeed should problems arise. Langer (1975) reported on six studies which showed that subjects making a variety of decisions expressed an expectancy of personal success higher than the objective probability would warrant. They tended to overestimate their skill or the impact it would have on the outcome.

Larwood and Whittaker (1977) comparing management students' and executives' performance on a marketing problem found further evidence for the illusion of control. The management students tended to overestimate their abilities and the performance of the hypothetical firm of which they were sales managers. Managers also overestimated performance in

this exercise but showed less tendency to do this if they had experienced unsatisfactory results in earlier planning experiences.

The effects of this process on evaluation of alternatives may have been responsible for the Heublein company's ill-fated decision to acquire the Theo. Hamm company in the mid 1960's. One of the central questions in the acquisition decision was whether or not Heublein executives had the marketing expertise to reverse Hamm's market share decline. Heublein executives' overestimation of their expertise in this area and the applicability of their expertise to Hamm resulted in the decision to acquire the company which later had to be sold at a substantial loss (Hofer, 1972).

Devaluation of Partially Described Alternatives. Finally, Yates, Jagacinski, and Faber (1978) demonstrated a preference for complete information which may affect decision-makers' evaluation of alternatives. Among a group of strategic alternatives, it is likely that the probable consequences of some of the alternatives will be more completely described than others. Yates, et al. found that decision makers tend to devalue the alternative that is partially described. Since partially described alternatives involve uncertainty for decision-makers, they tend to negatively evaluate these against alternatives which are better described and therefore, resolve more uncertainties.

According to John DeLorean, corporate level executives at General Motors exhibited this bias when they demanded inordinate documentation on proposals for projects before accepting them. Because of these demands, DeLorean's K-Car proposal was not accepted as more thoroughly documented proposals might have been. Each time the K-Car proposal was presented to corporate-level management, they made new demands for more information on

it. They finally shelved the proposed project in late 1970. The result, according to DeLorean, was that GM was unable to supply the light, fuel-efficient cars American consumers demanded after the oil embargo in 1973 (Wright, 1979: 216-218).

PROPOSITIONS

In selecting this relatively small number of simplification processes from the lengthy list of those identified in the behavioral decision theory and cognitive psychology literatures, an attempt was made to focus on those for which laboratory and field evidence exists. However, as was discussed earlier in the paper, there are problems in using both of these types of data to support the existence of these processes. For this reason, no claim can be made that they have been proven to exist in strategic decision-making.

However, research in cognitive psychology and behavioral decision theory may provide a framework for understanding strategic decision-making in complex environments and for developing propositions about the ways decision-makers may simplify the decision task. The laboratory results and examples from the field provide the basis for the following set of propositions regarding the effects of cognitive simplification processes at each stage of the strategic decision-making process. It is not assumed that these processes will affect all strategic decisions. In the conclusion of this paper, some of the conditions under which strategic decisions will be affected by the processes are specified. However, the propositions specify the way these processes may affect strategic decisions if decision-makers fall prey to them.

Goal Formulation/Problem Identification

1) Decision-makers under the influence of the prior hypothesis and adjustment and anchoring processes will tend to perceive fewer gaps than their data indicate (Levine, 1971; Pruitt, 1961; Wason, 1960; Jervis, 1976; Tversky & Kahneman, 1974; Kozielicki, 1981).

2) Decision-makers under the influence of the escalating commitment process will minimize the significance of gaps and will tend not to make full use of these gaps as a basis for strategy revision (Staw, 1981; Staw & Ross, 1978; Fox & Staw, 1979; Duhaime, 1981).

3) If the significance of a gap is recognized, decision-makers who reason by analogy will tend to define the problem causing the gap through an analogy to a simpler situation (Steinbruner, 1974; Tversky & Kahneman, 1974).

Strategic Alternatives Generation

4) In searching for a solution to a strategic problem, decision-makers using single outcome calculation and bolstering will tend to generate a single alternative rather than several alternatives (Steinbruner, 1974; Festinger, 1957; Janis & Mann, 1977).

5) Decision-makers who deny value tradeoffs and use inferences of impossibility will tend to deal with non-preferred alternatives by denying that they serve any values better than the preferred alternative and by overestimating the difficulty in implementing them (Steinbruner, 1974; Jervis, 1976; Dowe, 1977).

6) Under the effects of unchallenged assumptions and problem sets, decision-makers who attempt to generate more than one alternative will

tend to generate very few (Anderson & Johnson, 1966; Newell & Simon, 1972; Mason & Mitroff, 1981).

Evaluation and Selection

7) Decision-makers under the influence of the representativeness heuristic will tend to over-estimate the accuracy of their predictions of the consequences of alternatives (Tversky & Kahneman, 1974; Nisbett & Ross, 1980; Hartley, 1976).

8) Decision-makers under the influence of the illusion of control will tend to overestimate the importance of their own actions in assuring the success of strategic alternatives (Langer, 1975; Langer & Roth, 1975; Lefcourt, 1973; Larwood & Whittaker, 1977; Hofer, 1972).

9) Decision-makers will exhibit a preference for alternatives described in greater detail, even though partially described alternatives may score higher on the decision-maker's evaluation criteria (Yates et al., 1978; Wright, 1979).

CONCLUSION

In this paper, research on selected cognitive simplification processes has been summarized and conjectures regarding the possible effects of these biases on strategic decision-making have been developed. Of course these processes should not be regarded as universally harmful in organizations. Indeed, they may be functional in the extreme complexity of strategic decisions. Simplification processes during the goal formulation/problem identification stage may help to provide stability in organizational strategy by ensuring that strategies are pursued consistently over time. Single outcome calculation and the related processes may be necessary when

there is only one politically viable strategy. Simplification during the evaluation phase may increase the chances of successful implementation by increasing decision makers' confidence in a strategy and their commitment to it.

Effects of Group and Organizational Processes

As was mentioned earlier in the paper, cognitive simplification processes may not operate in all strategic decisions. Descriptions of top level public and private sector decisions provide examples of situations in which these processes did not lead to low quality decisions. In these situations, what Janis and Mann call vigilant information processing occurred and a number of alternatives were evaluated with some objectivity.

Quinn (1980) described well-managed companies in which environmental opportunities or threats were met by attempts to a) extend the range of alternative strategies considered (Xerox), b) broaden the information base available (Exxon) and c) build up active search routines for new alternatives (1980: 19-20). He also illustrated, with examples from Xerox and General Mills, how top management often "consciously created discussion forums and allowed slack time for their organizations to talk through threatening issues, work out the implications of new solutions, or gain an improved information base that would permit new options to be evaluated objectively in comparison with more familiar alternatives" (1980: 114).

Allison (1971) summarized the effective and objective decision-making of the Kennedy administration during the Cuban Missile Crisis.

A variety of responses to the presence of Soviet missiles in Cuba, from "doing nothing" to "a surprise military invasion of Cuba" were actively debated by advisors like George Bundy, Robert Kennedy, and Theodore Sorensen and considered by President Kennedy (1971: 185-187).

It is not possible at this stage in the research on simplification processes to specify the conditions under which each will or will not operate in organizational decisions. However, some general observations can be offered regarding group and organizational factors which may intensify the effects of these processes.

The basic assumption of this paper, which is supported by a number of writers on this subject, is that simplification processes are most likely to impact organizational decisions when there is a great deal of of consensus within the decision-making group. If all members of the decision-making group are in fundamental agreement with each other, or if the highest-ranking member of the group is able to enforce consensus around his or her basic assumptions, it is very unlikely that assumptions about the problem formed through these simplification processes will be challenged. Janis (1972) and Janis and Mann (1977) describe some of the problems produced by this type of consensus in their discussion of the phenomenon of Groupthink.

A high level of consensus may also develop if a decision-making group divides into two or more sub-groups, each cohesive within itself but with opposing preferences. Each subgroup may tend to use organizational data selectively to support its preferences in a debate and/or bargaining process in which assumptions are typically not closely or objectively

examined. Mason and Mitroff (1981) and Steinbruner (1974) discuss the potential problems arising from this type of debate or bargaining process.

However, if there is a divergence of assumptions among group members, if assumptions are held with some tentativeness, and if they are examined critically in the decision-making process, these simplification processes are more likely to be corrected. Assumptions underlying expert reports may be challenged and thus the effect of the simplification processes would be reduced (Mason & Mitroff, 1981; Nisbett & Ross, 1980).

Future Research

As was mentioned earlier in the paper, only a small group of simplification processes from earlier research have been identified in this paper for discussion in the context of strategic management. The summary articles listed in the introduction of this paper contain many additional "cognitive biases" which might have an impact on strategic decisions but which were not included in this review because examples of their operation in the field were not identified by the author. However, even among the processes selected for inclusion in the paper the support is somewhat variable. Only a single laboratory experiment and a single business strategy case was identified in support of one of the processes. For others, multiple laboratory experiments and field examples were identified.

Table 3 summarizes the simplification processes and the type of support identified for each. An asterisk has been placed beside the cognitive processes which seem to have the strongest support and, therefore, may hold the most promise for future research.

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Insert Table 3 about here
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Future research in this subject might involve the attempt to identify the effects of some of these cognitive processes on strategic decision-making and thereby to increase the interface between the fields of cognitive psychology, behavioral decision theory, and strategic decision-making.

Future research of this type should take two directions. First, since many of the simplification processes have been examined exclusively in laboratory research, an attempt should be made to document their existence and effects in field settings. Researchers may be able to identify the processes in executives' detailed descriptions of their own problem solving efforts such as those collected by Mintzberg, et al. (1976). Field observation of decision processes may also provide insights into the effects of these processes and the conditions under which they will operate in strategic decisions.

A second approach would involve further laboratory research investigating the effects of these processes using tasks more representative of the ill-structured problems encountered in strategic decision-making. Such concurrent laboratory and field research has been advocated in the most fruitful approach to research for several questions in strategic management (Schwenk, 1982).

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TABLE 1

Models of the Strategic Decision-Making Process

Hofer & Schendel (1978)	Mintzberg et al. (1976)	Glueck (1976)	Mazzolini (1981)	Derived Model
1.) Strategy Identification 2.) Environmental Analysis 3.) Resource Analysis 4.) Gap Analysis	<u>Identification Phase</u> 1.) Decision recognition 2.) Diagnosis	Appraisal (determine environmental threats & opportunities: company's comparative advantage)	1.) Decision-Need Identification	Goal Formulation Problem Identification
5.) Strategic Alternatives	<u>Development Phase</u> 3.) Search 4.) Design	Choice: Phase I (consider strategic alternatives)	2.) Search for Alternatives for Action	Strategic Alternatives Generation
6.) Strategy Evaluation	<u>Selection Phase</u> 5.) Screen 6.) Evaluation 7.) Authorization	Choice: Phase II (choose the strategy)	3.) Investigation of Courses of Action 4.) Review and Approval	Evaluation and Selection
7.) Strategy Choice		Implementation	5.) Implementation	Implementation
		Evaluation		

TABLE 2

Simplification Processes in Each Stage of Strategic Decision-Making

Stage I		Stage II		Stage III	
Goal Formulation/Problem Process	Problem Identification Effect	Strategic Alternatives Process	Generation Effect	Evaluation Process	and Selection Effect
1) Prior Hypothesis Bias	1) Evidence ignored gaps not perceived.	1) Single Outcome Calculation	1) Restricts alternatives to a single one.	1) Representativeness a) insensitivity to predictability b) insensitivity to sample size c) illusion of validity	1) Inaccurate prediction of consequences of alternatives.
2) Adjustment and Anchoring	2) Evidence underutilized, gaps not perceived.	2) Inferences of Impossibility	2) Premature rejection of alternatives.	2) Illusion of control	2) Inaccurate assessment of risks of alternatives.
3) Escalating Commitment	3) Significance of gap minimized, strategy not revised.	3) Denying Value Tradeoffs	3) Biased use of evaluation criteria.	3) Devaluation of partially described alternatives.	3) Rejection of strong but poorly presented alternatives.
4) Reasoning by Analogy	4) Problem misdefined (oversimplified), inappropriate strategy revision.	4) Problem Sets	4) Alternatives restricted.		

TABLE 3

Support for the Simplification Processes

<u>Process</u>	<u>Support</u>
1) Prior Hypothesis Bias	1) Multiple laboratory experiments, multiple anecdotal examples from international relations.
2) Adjustment and Anchoring	2) Multiple laboratory experiments, single anecdotal example from business strategy.
3) Escalating Commitment*	3) Multiple laboratory experiments, multiple anecdotal examples from business strategy.
4) Reasoning by Analogy*	4) Multiple laboratory experiments on related processes, multiple anecdotal examples from international relations, single example from business strategy.
5) Single Outcome Calculation,* Inferences of Impossibility, Denying Value Tradeoffs	5) Multiple laboratory experiments on related processes, multiple anecdotal examples from international relations, single example from business strategy.
6) Problem Set*	6) Multiple laboratory experiments, multiple anecdotal examples from business strategy.
7) Representativeness	7) Multiple laboratory experiments, two anecdotal examples from business strategy.
8) Illusion of Control	8) Multiple laboratory experiments, single anecdotal example from business strategy.
9) Devaluation of Partially Described Alternatives	9) Single laboratory experiment, single anecdotal example from business strategy.

*Especially promising for future research.

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