

COGNITIVE BIASES AND STRATEGIC DECISION PROCESSES:
AN INTEGRATIVE PERSPECTIVE*

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ABSTRACT

Previous studies have not adequately addressed the role of cognitive biases in strategic decision processes. In this article we suggest that cognitive biases are systematically associated with strategic decision processes. Different decision processes tend to accentuate particular types of cognitive bias. We develop an integrative framework to explore the presence of four basic types of cognitive bias under five different modes of decision making. The cognitive biases include prior hypotheses and focusing on limited targets, exposure to limited alternatives, insensitivity to outcome probabilities and illusion of manageability. The five modes of strategic decision making are rational, avoidance, logical incrementalist, political and garbage can. We suggest a number of key propositions to facilitate empirical testing of the various contingent relationships implicit in the framework. Lastly, we discuss the implications of this framework for research and managerial practice.

INTRODUCTION

Cognitive biases are an ever-present ingredient of strategic decision making. Clearly, a better understanding of how biases influence strategic decision processes should help managers in becoming more effective in achieving their goals. There has been a growing recognition among scholars of the importance of cognitive biases in strategic decision making. Nevertheless, little effort has been made to integrate cognitive biases with various modes of decision making beyond the early attempt by Lyles and Thomas (1988) to study biases in problem formulation. In fact, many scholars assume that some cognitive biases are 'strong tendencies' that are present in various situations (Zajac and Bazerman, 1991, p. 52). It is as if these cognitive biases apply equally to all strategic decision situations. In our view, such a monolithic assumption does disservice to our understanding of cognitive biases in strategic decision making, as contingent relationships exist between major biases and particular kinds of strategic decision processes. Schwenk (1984) argues for

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such relationships, stating that researchers are yet to specify the conditions under which each cognitive bias may be prevalent (p. 124).

Thus, our purpose here is to outline a contingency framework of cognitive biases in strategic decision processes. We propose that not all basic types of bias are robust across all kinds of decision processes; rather, their selective presence is contingent upon the specific processes that decision makers engage in. By examining these contingent relationships we not only clarify the domain and the role of key cognitive biases in strategic decision making, but also better differentiate various strategic decision processes.

We divide the paper into three sections. First, we discuss five modes of strategic decision processes. We next identify four major types of cognitive bias. In the third section, we examine these cognitive biases in terms of their roles in the five modes of strategic decision processes. We also develop propositions for empirical testing (and discuss the practical implications) of the more significant relationships between particular types of cognitive bias and specific kinds of strategic decision processes.

STRATEGIC DECISION PROCESSES

Strategic decision making is the process by which top management makes its most fundamental decisions. Strategic decisions are 'important, in terms of the action taken, the resources committed, or the precedents set' (Mintzberg et al., 1976, p. 246). Research on strategic decision processes has been fairly extensive, and the literature reveals a large number of decision modes (Cohen et al., 1972; Cyert and March, 1963; Das, 1986; Mintzberg et al., 1976; Quinn, 1980; Schwenk, 1995; Weick, 1979). Each of them denotes a different perspective for the decision process and highlights particular aspects of the process. Considerable empirical evidence has been found to support a number of these modes (see Eisenhardt and Zbaracki, 1992; Hart and Banbury, 1994; Schwenk, 1995). Since the coexistence of many seemingly contradictory decision modes generates much confusion, researchers have often felt the need to classify various modes (Cowan, 1986; Cyert and Williams, 1993; Eisenhardt and Zbaracki, 1992; Hart, 1992; Hickson, 1987; Hitt and Tyler, 1991; Lyles and Thomas, 1988; Shrivastava and Grant, 1985).

Eisenhardt and Zbaracki (1992) propose three dominant paradigms of strategic decision processes: rationality and bounded rationality, politics and power, and garbage can. The rational and boundedly rational paradigm is concerned with the degree to which decision makers have purposes, and describes strategic decision making as a rather purposive, systematic and comprehensive process (Allison, 1971). In this process, decision makers are supposed to start with known objectives, then collect information and develop alternatives, and finally identify the optimal course of action (Simon, 1955). The politics and power mode posits that the emergence, competition and resolution of conflicting interests are the essence of strategic decision processes (Baldrige, 1971; March, 1962; Pfeffer and Salancik, 1974). As decision makers harbour different and often conflicting goals in organizations, decision making often becomes a political operation whose ultimate result reflects the preference of the most powerful coalition. Finally, the garbage can mode (Cohen et al., 1972) portrays decision-making processes as organized

anarchies, in which a decision is largely dependent on chance and timing. In this kind of process, decision makers do not know their objectives *ex ante*, but merely look around for decisions to make.

Similarly, Hickson (1987) identifies three basic modes of decision making: dual rationality, incrementalism and garbage can. The dual rationality mode posits that 'decision making is a process of handling both problems and politics' (Hickson, 1987, p. 185), so that it could be viewed as an integration of the rational mode and the political mode. Incremental decision making is a step-by-step process and the strategy is always amenable to adjustment. A series of incremental actions is adopted to ensure that 'large, complex strategic problems are factored into smaller, less complex, and hence more manageable increments for implementation' (Joyce, 1986, p. 44). There is some distinction to be made between logical incrementalism (Quinn, 1980) and disjointed incrementalism (Lindblom, 1959), the difference being in whether there is consistency among the increments towards a broad (rather than local) objective (Joyce, 1986). The garbage can mode is the same one as in Eisenhardt and Zbaracki's (1992) study.

Finally, Lyles and Thomas (1988) list five primary modes of strategic decision making: rational, avoidance, adaptive, political and decisive. Four of these are similar to the modes identified by Hickson (1987) and Eisenhardt and Zbaracki (1992). For example, the adaptive mode is largely based on logical incrementalism, and the garbage can mode is the key constituent of the decisive mode. On the other hand, the avoidance mode (Cyert and March, 1963) – which delineates strategic decision making as a systematic process aimed at maintaining the status quo – appears to be an important supplement. In essence, the avoidance mode is about avoiding the identification of new problems so that strategic changes can be rendered unnecessary (Janis and Mann, 1977).

An examination of the above typologies indicates a considerable degree of consensus regarding what the major modes of strategic decision making are. Hence, rather than attempting to propose yet another typology, we essentially adopt Lyles and Thomas's (1988) typology and examine the following five primary modes of strategic decision making: (a) rational mode (Allison, 1971; March and Simon, 1958); (b) avoidance mode (Cyert and March 1963; Janis and Mann, 1977); (c) logical incrementalist mode (Quinn, 1980); (d) political mode (Baldrige, 1971; March, 1962; Pfeffer and Salancik, 1974); and (e) garbage can mode (Cohen et al., 1972). The slight modification in naming the decision modes is to conform to the way the major decision modes are generally known in the literature.

We recognize, of course, that there are various other frameworks of strategic decision making in the literature (e.g. Hart and Banbury, 1994; Nutt, 1984). For instance, Shrivastava and Grant (1985) suggest four prototypical patterns of strategic decision making: autocracy, bureaucracy, adaptive and political. However, we prefer Lyles and Thomas's list because it covers the most important modes of strategic decision making. Another reason is that this list of five modes seems to capture an underlying continuum: from the most systematic and structured decision processes at one end to the most ill-structured and anarchical decision processes at the other. We should note, though, that none of these five modes has explicitly incorporated cognitive biases into the strategic decision processes. Thus, the bias-related aspects in these decision processes remain largely unexplored. In the next section we cover the major types of cognitive biases.

COGNITIVE BIASES

Decision makers are known to rely on a few judgemental rules, or heuristics, to simplify complex decision situations. Although these 'rules of thumb' are often necessary and useful, they also introduce cognitive biases that can lead to severe and systematic errors in decision making (Kahneman et al., 1982). Thus, cognitive biases can be viewed as a negative consequence of adopting heuristics. Biases entice decision makers away from making optimal decisions in terms of utility maximization.

Scholars in cognitive psychology identify a number of heuristics and biases that individuals are subject to in making judgements under uncertainty (Bazerman, 1994; Hogarth, 1980; Slovic et al., 1977; Taylor, 1975; Tversky and Kahneman, 1973, 1974; Walsh, 1995). Decision makers also differ in terms of their individual temporal orientations, so that they tend to be more cognizant of either the near future or the distant future (Das, 1987, 1991). Based on extensive lab experiments, Tversky and Kahneman (1974) report that biases may result from three major heuristics: representativeness, availability, and adjustment and anchoring. Whereas representativeness refers to the tendency to 'imagine that what we see or will see is *typical* of what can occur', availability refers to the condition where '[w]hen imagining what could happen, we remember similar past situations' (Hogarth, 1980, p. 217). Decision makers also tend to make judgements based on an initial assessment as anchor, but fail to make sufficient adjustments later on. According to Tversky and Kahneman (1974), each heuristic may lead to several cognitive biases. For example, availability gives rise to the bias of retrievability, the bias of imaginability and so on. In addition, researchers have also called attention to some other cognitive biases, such as illusion of control (Langer, 1975), hindsight (Fischhoff, 1975) and overconfidence (Fischhoff et al., 1977). Kahneman and Lovallo (1993) use the term 'inside view' to describe decision makers' proneness to treat their problems as unique so that they can ignore historical statistics. Hogarth (1980) summarizes the various research findings and identifies 29 separate biases that are likely to occur in decision making, while Bazerman (1994) discusses 13 types of cognitive biases found in managerial decision making.

Based on these findings, strategy scholars highlight the issue of cognitive simplification and bias in strategic decision making. Since strategic decisions are characterized by ambiguities, uncertainty and a lack of structure, there seems to be no reason to expect strategists to be exempt from various cognitive biases (Schwenk, 1984). Support for this position is also derived from field studies that suggest the prevalence of these biases (Barnes, 1984). Recent research challenging the dominant strategy paradigms also highlights the importance of cognitive biases (Levy, 1994; von Krogh and Roos, 1996). For example, Levy (1994) applies chaos theory to strategy and suggests that long-term planning is essentially impossible, since industries, as chaotic systems, are extremely sensitive to initial conditions. It would thus seem that entertaining only a few possible scenarios is both practical and justified. Other researchers extend the concept of autopoiesis to strategic management. In autopoiesis, knowledge is not merely representations of the world, but rather is developed and is 'highly dynamic as managers make new observations, talk, use their imaginations to envision possible futures and courses of action' (von Krogh et al., 1994, p. 58). Thus, managers' own experiences and dispositions

help create knowledge that is potentially biased. Strategy scholars identify several biases they believe most likely to occur in strategic decision processes. Schwenk (1984, 1985), for example, identifies 11 cognitive biases, including prior hypothesis bias, single outcome calculation, illusion of control, and so on. He then classifies and maps these biases onto the three specific decision stages (i.e. goal formulation, alternative generation and alternative selection), according to their respective relevancy. Barnes (1984) also discusses five judgemental biases common to both managers and strategic planners, which he terms availability, hindsight, misunderstanding the sampling process, judgements of correlation and causality, and representativeness.

In recent years, a considerable number of empirical studies have been carried out (Bateman and Zeithaml, 1989; Bukszar and Connolly, 1988; Golden, 1992; Lant et al., 1992), providing further support to the prominence of cognitive biases in strategic decision making. According to Schwenk (1995), there is considerable research potential in this area. Following this cue, we believe that one important aspect that needs attention is the interactions between cognitive bias and strategic decision processes. Schwenk's studies (1984, 1985) provide insights about biases present in various stages of a general process of strategic decision making. However, given that not all strategic decision processes are the same, we need to explore in some detail the presence of various biases in different situations.

In order to do so, the first step seems to be the identification of a few key biases. March and Shapira (1987) describe three major heuristics (or biases in our terminology) that managers use in making strategic decisions. First, managers are insensitive to estimates of the outcome probabilities. Secondly, they tend to focus on several performance targets and a relatively small number of alternatives. And, thirdly, decision makers think that decision outcomes are subject to their control. As this list of biases is more succinct than other elaborate lists (e.g. Bazerman, 1994; Hogarth, 1980; Schwenk, 1985), we adopt it here with some modifications. We present the following four basic forms of cognitive bias: (1) prior hypotheses and focusing on limited targets; (2) exposure to limited alternatives; (3) insensitivity to outcome probabilities; and (4) illusion of manageability. Essentially, we have divided the second bias in March and Shapira (1987), i.e. focusing on several performance targets and a small number of alternatives, into two biases ((1) and (2) in our list). The reason is that targets (ends) and alternatives (means) represent two very different aspects in the decision process, and thus should be examined separately. Furthermore, the sequence of the biases has been reordered for increased clarity. Fredrickson (1984) notes that a strategic decision process consists of four sequential steps: situation diagnosis, alternative generation, alternative evaluation and decision integration. Thus, the four biases are now ordered keeping in mind a one-to-one correspondence with the four sequential steps (e.g. (1) is related more to situation diagnosis and so on). Although in spirit Fredrickson's sequence may be compatible only with a rational mode, we feel that this correspondence makes the list of biases easily comprehensible. Of course, we do not imply that other biases do not exist; rather, our intention here is to concentrate on those key biases which seem to be generally present in strategic decision processes. We now discuss these four cognitive biases.

Prior Hypotheses and Focusing on Limited Targets

Research shows that decision makers are likely to bring their previously formed beliefs or hypotheses into decision-making situations. For example, they may have prior perceptions about the relationships of salient variables, so that they might overlook information and evidence that may prove the opposite (Schwenk, 1984). At the same time, managers have been found to focus on selected targets, rather than on broad objectives (March and Shapira, 1987). Their attention focuses on those key objectives that appeal to their interests, and therefore they tend to ignore information about other worthwhile objectives. Hoskisson et al. (1991) observe that the use of budgetary controls leads managers to focus on selected critical performance targets. In sum, bringing prior hypotheses to decision making and attention to selected targets together result in a biased perception of the environment and the problem at hand.

Exposure to Limited Alternatives

Strategic decision makers also expose themselves to only a limited number of alternatives that can achieve a goal (March and Shapira, 1987). Information is usually incomplete in decision-making situations, so that decision makers tend to focus on a relatively small number of options (March and Simon, 1958; Simon, 1955). Decision makers are found to adopt sequential attention to alternatives (Anderson, 1983) and to use intuition to supplement rational analysis (Fredrickson, 1986). As a result, 'rather than attempting to specify all relevant values and goals and generate a number of alternative courses of action as normative theory would suggest', decision makers are exposed to limited options (Schwenk, 1984, p. 119).

Insensitivity to Outcome Probabilities

Research has shown that decision makers do not trust, do not understand and usually do not use estimates of outcome probabilities (Kunreuther, 1976; Slovic, 1967). Managers tend to be influenced more by the value of possible outcomes than by the magnitude of the probabilities (Shapira, 1995). Managers are more likely to use a few key values to describe a situation, rather than to compute or use standard statistics based on probabilities (March and Shapira, 1987). Another reason decision makers do not use estimates of probability is that they see problems as unique (Kahneman and Lovallo, 1993). Thus, probability estimates and statistics from comparable events in the past become irrelevant. In addition, decision makers are also characterized by their insensitivity to the validity of estimates (Tversky and Kahneman, 1974).

Illusion of Manageability

Developing an illusion of manageability is yet another type of cognitive bias, which manifests itself in two ways. First, decision makers may inappropriately perceive a success probability higher than the objective probability would warrant (Langer, 1975; Langer and Roth, 1975; Lefcourt, 1973), and then have an illusion of control. In this case, although they are concerned with outcome probabilities, they tend to form overly optimistic estimates. They do not accept the fact that a fair amount of risk is inherent in any decision situation. In a contrasting way, managers tend to overestimate the extent to which an outcome is under their

control, believing that risk can be reduced by using their professional skills (Shapira, 1995).

Second, managers have the illusion that consequences of decisions are manageable (Vlek and Stallen, 1980). They mistakenly assume that should problems arise they would be able to fix them. Decision makers tend to believe that outcomes can be contained, corrected or reversed, given some extra efforts. Shapira (1995) found that managers believe in 'postdecisional control', which allows them 'to influence whatever goes on *after* the moment of choice' (p. 80). The illusion of manageability of bad outcomes eases managers' anxiety over such outcomes.

COGNITIVE BIASES IN STRATEGIC DECISION PROCESSES

So far we have discussed four key types of cognitive bias and have identified five basic modes of strategic decision making. We will now discuss the more salient relationships among these biases and decision processes. As mentioned earlier, the literature has generally deemed cognitive biases as prevailing across situations (Zajac and Bazerman, 1991). This may lead one to believe that these biases are equally manifested under all conditions. To this point, few studies have explicitly questioned the plausibility of such an assumption. Schwenk (1984, 1985) only explored the contingent relationship between biases and stages of decision making through his classification of different biases into three decision stages. Lyles and Thomas (1988) list different biases in five strategic decision modes, but fall short of making the point that the presence of a specific bias is contingent upon the particular decision process. We assert that, because strategic decision processes can be significantly different, there is a need to examine the contingencies between the biases and various decision processes. It would thus seem that different modes of strategic decision making will attract different combinations of the basic types of cognitive bias (see table I). In some decision modes more types of cognitive bias may be present, while in others fewer types will be evident. We now discuss each of the five modes of strategic decision making in terms of the four types of cognitive bias, and develop testable propositions for the more significant of these relationships.

Rational Mode

The rational mode is the benchmark against which all the others are considered because it is based on the assumption that human behaviour is rational or boundedly rational (Eisenhardt and Zbaracki, 1992; March and Simon, 1958). In this mode, the decision makers are assumed to enter decision situations with known objectives, and that in the process managers diligently analyse both the external environment and internal operations. Therefore, decision making is a comprehensive, normative process in which top managers gather information, develop alternatives, and then objectively select the optimal alternative (Anderson, 1983; Nutt, 1984). Following this mode, organizations employ formal, comprehensive analyses to deal with uncertainties in decision making. These formal decision-making systems quantify and specify goals and alternatives, and then choose the one with best values.

Some theorists, however, suggest that the process can be only boundedly

Table I. Cognitive biases and strategic decision process modes

		<i>Strategic decision process modes</i>				
		Rational	Avoidance	Logical incrementalist	Political	Garbage can
Cognitive biases	Prior hypotheses and focusing on limited targets	1 P1	5 P3	9	13 P7	17
	Exposure to limited alternatives	2	6 P4	10	14	18 P8
	Insensitivity to outcome probabilities	3	7 P5	11	15	19 P9
	Illusion of manageability	4 P2	8	12 P6	16	20

Note.

P = Proposition

rational, due to decision makers' limited cognitive capabilities. In this view, although decision makers attempt to enhance the rationality of their decisions by engaging in exhaustive processes, their cognitive limitations preclude the possibility of a truly comprehensive process. Researchers note that executives can perceive only a selected portion of the environment (e.g. Beyer et al., 1997). Significant evidence also indicates that the degree to which executives accurately perceive their external environment may vary greatly (Bourgeois, 1985; Sutcliffe, 1994; Thomas et al., 1993; Thomas and McDaniel, 1990). Despite the difference between the truly rational and the boundedly rational, the consensus seems to be that decision making consists of a series of sequential, analytical processes (Dean and Sharfman, 1993; Huff and Reger, 1987). In fact, Simon (1978) proposes the term 'procedural rationality' – that is the extent to which a decision process reflects decision makers' intention and efforts to make the best decision possible. Thus, Fredrickson and his associates (Fredrickson, 1984, 1986; Fredrickson and Mitchell, 1984) argue that the most basic characteristic of rational decision making is its 'comprehensiveness', i.e. the degree of exhaustiveness and inclusiveness in making and integrating strategic decisions.

When strategic decision-making processes follow the rational mode, cognitive biases are still inevitable. In terms of the four basic types of bias, two are highly likely in the rational mode. First, according to the rational mode, decision makers enter decision situations with known objectives (Allison, 1971; Simon, 1955). These *a priori* hypotheses, objectives and goal consensus lead decision makers to focus on particular parts of the environment and problems (Bourgeois and Eisenhardt, 1988). Therefore, cell 1 (in table I) exemplifies a likely situation. The

emphasis in rational decision making is not on extensive search for objectives; rather, it highlights the value of gathering information about alternatives and outcomes. Referring to the machine bureaucracy, Mintzberg asserts that much of the information generated by its management information system is of the wrong kind (1983, p. 184). In the same vein, Baird and Thomas (1985) posit that the major drawbacks of formal analyses, such as risk analysis, decision analysis and cost-benefit analysis, are 'their lack of openness and explicit recognition of the different value systems implicit in strategic decisions' (p. 240). Therefore, rational decision making may create an 'error of the third kind' (Raiffa, 1968) – that is solving the wrong problem. Hence:

Proposition 1: The more rational and systematic the strategic decision process, the more likely the managers will bring prior hypotheses to decisions.

On the other hand, exposure to limited alternatives (cell 2) is not likely to occur in the rational mode. In fact, the essence of the rational approach is to systematically develop and consider strategic alternatives. Comprehensiveness is what decision makers in the rational mode endeavour to achieve (Fredrickson, 1984). Thus, even though a rational process may not exhaust all possible strategic options, decision makers should have access to reasonably broad alternatives.

Similarly, in the rational mode, being insensitive to outcome probabilities (cell 3) is not a likely occurrence. Systematic evaluation of alternatives is important in the rational mode. The value of the possible consequences of each alternative is gauged, based on the known objectives. As a result, accurate estimates of outcome probabilities become the prerequisite for the evaluation process, and managers are supposed to pay close attention to these estimates.

In cell 4, the illusion of manageability could be present in rational decision making. After gathering information, developing and evaluating alternatives, decision makers tend to be confident that they have selected the optimal alternative. Often, merely going through this process effectively generates confidence about results instead of actually coming up with suitable options. In other words, the process itself is believed to provide justification and rationality. Lyles and Thomas (1988) suggest that wishful thinking and rationalization are possible biases in the rational mode. Furthermore, decision makers may also believe that they have managed the risks by employing their skills, so that nothing really bad could happen. In essence, decision makers in the rational mode tend to perceive the risk inherent in an action as somewhat lower than its actual level (March and Shapira, 1987). Thus:

Proposition 2: The more rational and systematic the strategic decision process, the more likely the managers will have an illusion of manageability.

Avoidance Mode

The avoidance mode is concerned with the fact that strategic decision-making processes often lead to a resistance to strategic change (Janis and Mann, 1977; Mintzberg et al., 1986). The avoidance mode is based on Cyert and March's (1963) observation that organizations tend to avoid uncertainty. Therefore, maintaining the status quo is a highly desirable objective. Studies on upper

echelons (e.g. Hambrick et al., 1993) confirm that commitment to the status quo is a significant executive orientation, and it is common for managers to be overly committed to the status quo. Furthermore, according to Miles and Snow's (1978) strategic typology – that is reactors, defenders, analysers and prospectors – one type of firm can be classified as reactors because they usually fail to adapt to environmental changes. These firms are likely to follow an avoidance mode in their decision processes.

Prospect theory of risk taking (Kahneman and Tversky, 1979) provides an alternative rationale for the avoidance mode. According to prospect theory, decision makers are loss averse, weighing losses and disadvantages more than gains and advantages. Therefore, they favour 'inaction over action and the status quo over any alternatives' (Kahneman and Lovallo, 1993, p. 18). Hickson (1987) confirms that executives take risks only when they have to. One way to avoid substantive decision making is to suppress issues that then do not become matters for decision. Mintzberg (1978) observes that organizations prove highly resistant to strategic change when the market environment undergoes major change. Organizations may choose to ignore symptoms of a problem, hoping the problem will eventually go away. On the other hand, Butler et al. (1979/80) suggest that avoidance of strategic change occurs when there is no pressure for new activities or no competition for resources. Though there is disagreement regarding the context of strategic avoidance, it seems clear that strategic decision making sometimes becomes a process to justify the necessity of maintaining the status quo. As Mintzberg et al. (1986) argue, formal strategic planning could be a mechanism that curbs strategic change.

Decision makers who value the status quo highly, and therefore try to avoid strategic change, actually harbour considerable biases in their decision making. In this mode, managers tend to avoid the identification of new problems (Janis and Mann, 1977), but problems not being recognized will not go away. Existing problems may well accumulate as time passes, until a crisis happens. The risk of adopting an avoidance approach seems to be serious, as three out of the four types of cognitive bias can be present.

In cell 5, it is evident that (in the avoidance mode) the prior hypothesis is that maintaining the status quo is important. The sole objective of the decision process is to justify this position, even when change appears warranted. Such highly focused attention often leads to irrational decisions, owing to the well-known phenomenon of escalating commitment (Staw, 1981). Clearly, here the prior hypotheses are that quitting is undesirable and that persistence will ultimately pay off. Thus:

Proposition 3: The more emphasis on maintaining the status quo in a strategic decision-making process, the more likely the managers will bring prior hypotheses to decisions.

Also, managers in the avoidance mode are likely to limit themselves to selected options (cell 6). Since the objective is to keep the situation unchanged, the process of developing alternatives also loses its rationale. Once the strategic objective becomes static, everything else in the system tends to follow established routines. Actively developing options would only undermine the status quo. Besides a lack

of motivation among managers, a second reason may be that managers who are used to following an avoidance mode become less capable in developing creative solutions. Hambrick et al. note that 'one could be committed to the status quo because it is all he or she knows, unaware of other options' (1993, p. 404). Hence:

Proposition 4: The more emphasis on maintaining the status quo in a strategic decision-making process, the more likely the managers will be exposed to limited alternatives.

Furthermore, in the avoidance mode, managers' insensitivity to outcome probabilities is to be expected (cell 7). When all attention is focused on maintaining the status quo, it seems perfectly legitimate to reject or ignore estimates of probabilities that do not match expectations, in order to avoid cognitive dissonance (Festinger, 1954). If managers are preoccupied with the status quo, estimates of outcome probabilities lose their relevance in the decision-making process. Consequently:

Proposition 5: The more emphasis on maintaining the status quo in a strategic decision-making process, the more likely that managers will be insensitive to outcome probabilities.

Finally, managers' illusion of manageability (cell 8) does not seem likely in the avoidance mode. Strategies for change are avoided mostly because managers cannot foresee what is going to happen. Maintenance is preferred when they are not sure what else is better. Under such circumstances, a sense of being in control and managing outcomes is not likely to be developed. As Miles and Snow (1978) note, reactors fail to be adaptive because they lack the organizational resources and capabilities to understand and cope with environmental changes.

Logical Incrementalist Mode

According to the logical incrementalist mode, strategic decision making is a step-by-step incremental process (Quinn, 1980). In contrast to Lindblom's (1959) disjointed incrementalism, which has its roots in public administration, Quinn (1980) found that in private industries logical incrementalism is more pervasive. Since the environment is unstable and managers' cognitive capabilities are limited, it is best to choose the smallest increments possible to achieve strategic objectives (Hrebiniak and Joyce, 1985). Other researchers (e.g. Vickers, 1965) argue that organizations move slowly so that they can remain flexible enough to be able to assimilate new information. From an emergent point of view, Weick (1979) suggests that an organization has to act first, usually in small steps, in order to make sense of its environment and its own operation. Feedback from the initial action then allows the organization to make adaptations. In sum, there are three characteristics of the logical incrementalist decision-making process. First, the process is incremental in nature and no dramatic decision is made at any time. Second, the decision-making process is a consistent movement towards a broad or global goal (Joyce, 1986), or 'muddling with a purpose' (Wrapp, 1967). Lastly, the purpose of moving incrementally is to gather more information and feedback from the initial action.

In the logical incrementalist approach, a manager 'probes the future, experiments, and learns from a series of partial (incremental) commitments rather than through global formulations of total strategies' (Quinn, 1980, p. 58). At the same time, 'logical incrementalism honors and utilizes the global analyses inherent in formal strategy formulation models' (Quinn, 1980, p. 58). Taken together, the logical incrementalist mode shares the clear purpose of the rational mode but prescribes not taking a stand too early. In this mode, strategic goals are broad and relatively vague, so that they can be modified when more information becomes available.

As a result, having prior hypotheses and focusing on certain targets (cell 9) are not the kind of bias that would be common. Instead, decision makers are expected to formulate their strategic goals through highly incremental processes. Organizational objectives are broad and vague and are open for development and adjustment all the time. Although decision makers may have a prior preference for an incremental approach, they would tend not to have a predetermined preference for limited targets. Rather, they would search for the fittest target. Consequently, the process is different from the so-called anchoring process (Tversky and Kahneman, 1974), in which a position is taken at the very beginning.

Similarly, managers expose themselves to broad alternatives (cell 10) in this incremental mode in two ways. In the first, the thrust of logical incrementalism is to gain access to broad options and then narrow down the range of the relevant ones over time. The second way is to constantly develop and evaluate options, based on feedback from actions. According to Quinn (1980, p. 57), 'effective executives constantly tried to visualize what new patterns might exist among the emerging strategies in various subsystems'. Though initially decision makers may have to quickly adopt one alternative that seems to be workable, along the way they will have access to other alternatives. To move slightly towards one direction does not mean that one has to stick to it. In fact, while at any given time decision makers are able to examine only a few alternatives, over time they would go through a fairly exhaustive list of options (Hickson, 1987). The step-by-step approach gives an organization the flexibility to consider emerging alternatives. Because strategists do not make drastic decisions, they keep the company open to options. Also, since they keep getting information and keep conducting global analyses, they do not unduly miss an alternative.

Furthermore, decision makers must be very sensitive to the estimates of outcome probabilities (cell 11), according to the incremental mode. Trusting the estimates, being sensitive to the estimates and acting on the basis of the estimates are prerequisites for logical incrementalism. Quinn's (1980) insistence that incrementalism employs formal analysis of the situation reflects the attention paid to outcome probabilities.

Finally, the adoption of the logical incrementalist mode tends to encourage the development of an illusion of manageability (cell 12). By emphasizing its 'logic' and its 'incrementalism', decision makers have the false impression that everything is under control. Managers may perceive that the inherent risks facing them could be controlled by moving slowly and carefully. Since they move only one small step at a time, they are likely to believe that even if some unexpected outcomes were to materialize, they would be able to manage or control the situation. This leads us to:

Proposition 6: The more logical incrementalist the strategic decision process, the more likely the managers will have an illusion of manageability.

Political Mode

Different from the incremental mode, decision makers in the political mode are often unable to attain even a broad consensus on organizational objectives (Pettigrew, 1973). The political mode of decision making assumes that groups of organizational members with competing interests fight for a decision favourable to them. The outcome is therefore decided by those who can form the most powerful coalition. Each party perceives the problem in the light of its own domain of interests (Simon and Hayes, 1976). People tend to be politically biased, and full information is never available. Each group attempts to protect and maximize its own interests through political activities. As Eisenhardt and Zbaracki put it, 'people are individually rational, but not collectively so' (1992, p. 23). Inevitably, strategic decision making becomes a process of power struggle, and the most powerful people win the game. Scholars note (e.g. Amason, 1996) that in strategic decision processes there are both cognitive conflicts – that is, judgemental differences – and affective conflicts – that is, personal incompatibilities or disputes. Thus, the political decision mode would tend to create affective conflicts among different camps.

Decision makers in the political mode bring prior hypotheses to the decision situation and focus on limited targets (cell 13). Groups of people can perceive limited targets only as related to their own interests, which are constant across decisions (Hickson et al., 1986). Studies (e.g. Taylor, 1975) show that coalitions within an organization tend to use their past experience and histories to construct a problem perception. Many coalitions simply take the same position every time, never bothering to examine their hypothesized values. Therefore:

Proposition 7: The more political the strategic decision process, the more likely the managers will bring prior hypotheses to decisions.

Regarding the biases arising from exposure to limited alternatives (cell 14) and insensitivity to outcome probabilities (cell 15) in a political decision process, the literature offers two competing views. On the one hand, it has been argued that most political processes are static, and that decision makers tend to be embedded in their positions and interests. Browne (1992) points out that decision makers in a political process not only consider a small number of alternatives, but also a limited number of consequences. Following this view, decision makers in a political process are defined by, restrained and attached to their predetermined interests and positions. The level of flexibility would be significantly limited in a political process as compared with that in a non-political process. Therefore, it seems logical to assume that coalitions would not comprehensively develop all possible alternatives. Even though different coalitions may each provide a different alternative, the total range of alternatives is unlikely to be sufficiently broad.

On the other hand, however, it has also been argued that the political process can be fluid and that decision makers may easily shift their positions if necessary (March, 1962; Pfeffer, 1981). According to this view, decision makers would be

flexible regarding their stance, e.g. being willing to trade between short-term and long-term interests. As Eisenhardt and Zbaracki observe, the traditional view assumes politics as fluid, and 'they [decision makers] vary their political tactics like teenagers change radio stations' (1992, p. 26). The political process is characterized by a determination to realize one's best interests, no matter what route one may have to take. Hence, besides the target itself, there is hardly anything static in a political process. Actors in a political process are required to be skillful in making compromises, horse-trading, shifting positions and repackaging proposals.

Taking this more dynamic view of political processes, it seems that exposure to a few selected alternatives would not be a likely occurrence (cell 14). Nemeth's (1986) work on the influence of minority opinions lends considerable support for this position. According to this line of research (Nemeth and Kwan, 1987; Peterson and Nemeth, 1996), exposure to minority viewpoints stimulates decision makers to consider a problem from multiple perspectives. That is, a minority viewpoint unfreezes people's convergent thought and opens up new approaches to the issues. The result is that decision makers go beyond both the majority view and the minority view. Applying this finding to the political mode of strategic decision making, it seems that opposing views offered by various groups activate decision makers to think creatively and develop additional solutions to an issue. Thus, as compared to many other modes of operating, under circumstances in which the political mode prevails, decision makers are less likely to fall prey to cognitive biases arising from an exposure to limited alternatives.

Using a similar logic, it seems that in the political mode, decision makers would be quite sensitive to outcome probabilities (cell 15). Of course, one may argue that decision makers in a political process are supposed to take a stand at the very beginning of the decision process and fiercely resist others. Since everyone is supposed to have a definite view, probability estimates just cannot rock anyone's beliefs. Again, this view may be exaggerating the robustness of the political process (March, 1962). In fact, managers engaged in political behaviour need to be highly attuned to outcome probabilities, or they would become more vulnerable. The importance of outcome probabilities in a political process is underlined by the heavy reliance on information about evolving trends and changes in the environment. In organizational politics, decision makers also frequently shift their positions based on their best estimate of outcome probabilities. Since the goal is to bring about the outcome that best serves one's interest, decision makers in a political process simply cannot afford to ignore outcome probabilities.

Finally, developing an illusion of manageability (cell 16) is not to be expected in this mode. Political processes are characterized by a high level of uncertainty. Pfeffer (1981) and Pettigrew (1973) emphasize the tactical aspects of politics. For example, information may be manipulated to favour a particular alternative. Thus, when a strategic decision is made through a political process, often it is hard to foresee which party's intentions would prevail. In addition, defeated coalitions are often able to come back later and reverse a situation. Thus, in a political process, decision makers understand that a winning course of action may not be the result of being the best on grounds of merit; rather, it could be only a temporary victory in a continuing series of battles. If that is the case, an illusion of manageability is unlikely to be fostered.

Garbage Can Mode

The most uncertain and fluid mode of strategic decision making is the garbage can mode (Cohen et al., 1972; Kreiner, 1976; Padgett, 1980). The garbage can mode of strategic decision making has no inherent consistencies. As organizations are viewed as 'organized anarchies', there is no particular rationale for making a strategic choice. The decision process consists of four components: (1) choice opportunities, (2) solutions, (3) participants and (4) problems. Decision making is conceived in terms of problems looking for a choice opportunity, solutions looking for problems to address, and decision makers looking for a job (Cohen et al., 1972). What accounts for the outcome is only timing and chance. However, although managers have little control over the process, some of their cognitive biases may still be prevalent in that process.

The first bias, i.e. prior hypotheses and limited targets, is not prominent in this mode (cell 17). Managers are not committed to any objective; they do not hold any prior hypothesis regarding the situation. They 'wander in and out of the decision' (Eisenhardt and Zbaracki, 1992, p. 27), not knowing what they want and often changing their minds. The reason they enter the decision-making process is just to look for jobs to do (Cohen et al., 1972).

On the other hand, decision makers in the garbage can mode do limit themselves to selected alternatives only (cell 18). First, in the garbage can mode, solutions exist only from trial-and-error learning, rather than being actively developed. In this mode, existing solutions look for appropriate problems that can be addressed. Decision makers have particular expertise and predilections, and they are constantly looking to act upon them. As solutions need to be already in existence, the stream of solutions for any particular problem is unlikely to be rich. Second, since the key to decision making is a timing match among problems, choice opportunities and solutions, even existing solutions may not all have been approached before a decision is made. That is, decisions are made when decision makers first see an existing solution matching a problem. Thus, other alternatives may not be developed or considered. Therefore:

Proposition 8: The more disorderly and anarchical the strategic decision process, the more likely the managers will be exposed to limited alternatives.

Moreover, decision makers would be insensitive to outcome probabilities (cell 19) in this mode. Actually, what they are looking for is just something to decide, no matter what kind of consequences the option may carry. Therefore, estimates of probabilities do not catch decision makers' attention at all. Indeed, probability estimates are not one of the components in the garbage can mode. If only chance matters, why bother about outcome probabilities? Consequently:

Proposition 9: The more disorderly and anarchical the strategic decision process, the more likely the managers will be insensitive to outcome probabilities.

Lastly, in the garbage can mode, managers usually do not develop an illusion of manageability (cell 20). The outcome of such decision making processes is random and not subject to any effective control, and managers do not even know what is their desirable outcome (Cohen et al., 1972). How could they in such circum-

stances have confidence in the results? They would not bother to think about any outcome probability or about managing possible consequences. In this mode, the role of managers seems to be diminished to the minimum.

DISCUSSION AND CONCLUSION

It is evident from our discussion in the previous section that none of the five modes of strategic decision making explicitly considers the role of cognitive biases. Bias is treated as something inherent but unremarkable in the process and effectively assumed away, so that cognitive bias is not addressed at all. As a result, we do not at present have an adequate understanding about what cognitive biases mean to strategic decision processes.

On an overall basis, our analysis revealed that the four types of cognitive bias, taken together, have a substantive role in all the five modes of strategic decision making (see table I). As it turns out, each cognitive bias has some role in differing subsets of the five decision processes. This would indicate that the four types of cognitive bias identified in this paper have sufficient relevance individually and in combination for all the five decision processes.

Furthermore, while three cognitive biases are present in the avoidance mode, only two are present in the rational and garbage can modes, and only one each in the logical incrementalist and political modes. If we look at the differences of cognitive biases among the various strategic decision-making modes, it is not hard to see that the rational mode and the garbage can mode complement each other. The reason for the pairing is that the garbage can mode and the rational mode represent two poles in terms of the degree of rationality and control (Das, 1989, 1993). Decision makers in the rational mode emphasize a strict control over the process, so that they take risks by having predetermined objectives and by being overly confident. In contrast, decision makers in the garbage can mode give up control totally and let everything be fluid in the process. As a result, it suffers from inadequate alternatives and insensitivity to outcome probabilities. By the same token, the match between the avoidance mode and the logical incrementalist mode reveals their inherent similarity as well as contrast. Neither of them is about dramatic strategic change. However, what makes them different is that the incremental process moves slowly, while the avoidance process leads to no change at all. Since these two modes exhibit seemingly similar characteristics, although driven by somewhat different motivations, it is evident that they mutually share those four basic types of cognitive bias.

Examining the framework (table I) horizontally, two types of cognitive bias (namely, exposure to limited alternatives and insensitivity to outcome probabilities) seem to follow a similar pattern. When a decision process is characterized by exposure to limited alternatives, managers can also be expected to be insensitive to outcome probabilities. Contrariwise, if one type is absent, the other type tends to be absent too. The explanation is that the presence of both types of cognitive bias is determined by the rationality consideration. If the process involves a rational and logical development of strategic choices, as the rational and the incremental modes do, these two types of cognitive bias would be absent. On the other hand, if factors other than rationality consideration, such as power, underlie

the process, then managers would be more likely to ignore some options and probabilities. Hence, these two types of cognitive bias would tend to appear in tandem. The other two biases are also present in various decision processes. For example, the illusion of manageability is expected to occur in both the rational mode and the logical incremental mode. This seeming contradiction is due to the fact that both modes help decision makers believe that the probability of success is high, and that potential problems can be fixed. Apparently, although the rational mode and the logical incremental mode are different in many respects (e.g. regarding prior hypotheses), they are similar in terms of generating the illusion of manageability.

We examined the contingent relationships between cognitive biases and strategic decision processes. By proposing an integrative framework, we sought to make two theoretical contributions. First, we attempted to show that the prevalence of cognitive biases is contingent upon the nature of the particular decision process. Extant research explores only various types of cognitive bias, without specifying the conditions under which each type may be evoked in practice. We proposed that the presence and nature of cognitive bias is contingent upon the character of the specific strategic decision-making process. Not all of the four basic types of cognitive bias are present in every specific decision process. Certain modes of decision process seem to elicit particular combinations of cognitive bias. However, we need to recognize that other factors are also involved in determining the presence of specific types of cognitive bias. In particular, it would be useful to study the roles of various individual, organizational, environmental and cultural variables as they relate to the presence of managerial cognitive biases in strategic decision processes.

The second contribution here is that we provide an additional perspective for understanding various kinds of strategic decision processes. Theorists have often stressed the need to better differentiate various strategic decision processes found in the literature. In our view, the ambiguities in our understanding stem partially from the failure to incorporate cognitive biases into these decision modes. The critically relevant cognitive biases have not been systematically included or examined in previous writings on most modes of strategic decision making. We demonstrate in our framework that cognitive biases provide a meaningful perspective for evaluating different kinds of strategic decision processes.

We show that managers involved in different decision processes exhibit different combinations of four basic types of cognitive bias. For example, managers in the avoidance mode are likely to engage in most of the basic types of cognitive bias. In contrast, managers subscribing to the logical incrementalist mode and political mode tend to adopt only one type of cognitive bias. By taking cognitive biases into account, various strategic decision processes can now be better differentiated and understood. The list of propositions we developed here has as its eventual purpose the empirical testing of the contingent relationships between the four types of cognitive bias and the five modes of strategic decision processes.

Finally, the integrative framework we proposed here also has implications for managerial practice. Heuristics and biases are often valuable and indispensable for effective decision making. This may be particularly relevant for strategic decisions, which are highly uncertain and need to be made in a timely fashion. Clearly, in order to avoid systematic errors arising from biases, managers need to be keenly

aware of the assumptions, heuristics and biases employed in their decision making. Thus, they ought to examine their own cognitive biases, which may be more easily identified and appreciated than one might think possible. For example, managers could check if they have a tendency to reject alternatives without carefully weighing them. They could also review whether they make decisions based on rigorous estimates of probability. Such procedures would enable managers to reveal for themselves any cognitive biases inherent in their decision making, and thereby be in a position to make appropriate adjustments.

NOTE

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