

Strategic Bias: The Impact of Cognitive Biases on Strategy

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Abstract

Retrospective sense-making produces the perception of a world more orderly than it is. Outcomes are recalled as more predictable than they seemed in prospect. This inflated perception of order may bias strategic management towards strategies designed to take advantage of expected orderliness, leading to systematic underinvestment in flexibility. A model of this phenomenon is presented and the implications discussed.

Resumé

Le fait de donner rétrospectivement une signification crée la perception d'un monde plus ordonné qu'il ne l'est. Par conséquent, les résultats sont plus prévisibles qu'ils ne le semblaient en perspective. Cette fausse perception d'ordre peut conduire à une gestion stratégique conçue pour profiter d'un ordre attendu et inciter les dirigeants à systématiquement sous-investir dans la flexibilité de leurs entreprises. Cet article présente un modèle qui illustre ce phénomène et les conséquences qui en découlent.

Strategy as Balance Between Foresight and Flexibility

In an evaluation of poor performance at IBM, Hamel and Prahalad (1994) indicated that "many of IBM's operational failures in the 1990s could be traced to foresight problems in the 1980s" (p. 76). In a similar vein, Reid (1989) stated: "If the correct strategic choices were made in a timely fashion, IBM might not have earlier locked its product activities so tightly to mainframe development, and thus been more of a pioneer in PC hardware and applications software; thus it may have occupied a more advantageous strategic positioning" (p. 564).

These authors suggested that poor foresight on the part of IBM's key decision-makers led to ineffective decisions. With proper foresight, IBM decision-makers should have been able to pioneer markets by taking early action based on foresight. Note that in hindsight, the outcomes seem less surprising, and it is easy to believe that they were relatively more predictable in foresight.

To effect a turnaround, the IBM Board of Directors made a significant change in the management team. A new CEO, Louis V. Gerstner Jr., was brought in from outside the organization. When Gerstner was introduced

as the new CEO he was asked to share his vision for IBM. His now famous reply was: "The last thing IBM needs is a vision." (Lavin, 1993). He then made changes that improved decision-making speed in the organization, increasing its ability to react to—and thus decreasing its need to predict—changes in the environment.

This example highlights a central tension in strategy between the need for foresight, to initiate effective strategies, and flexibility, to adapt to the unpredicted. In this vein, Bowman and Hurry (1993) described strategy as 'option' theory, whereby a firm 'holds' or 'strikes' options, depending on the degree of environmental uncertainty. They suggested that the greater the environmental uncertainty, the more the organization stands to gain (and the less it risks losing) by holding an option; conversely, the lower the environmental uncertainty, the more the organization stands to gain by striking the option.

Accurately perceiving the level of environmental uncertainty is critical to the development of strategy and the alignment of organizational resources. Yet there is a broad body of evidence in the behavioural decision-making literature that suggests that accurate perceptions are hard to come by (see, for example, Hogarth & Makridakis, 1981; Stubbart, 1989). Bowman and Hurry (1993) suggested that misperceptions occur due to cognitive bias, but they also indicated that the direct impact on strategy is unclear. This is because misperceptions are seen as resulting in variation around a mean, with the central tendency being an accurate perception of envi-

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ronmental uncertainty. As a result, underestimation and overestimation of environmental uncertainty would be expected to occur with equal frequency in organizations overall. Such errors would result in misalignment of strategy and the environment, but on a random rather than a systematic basis. In other words, misperceptions would lead some organizations to adopt strategies that were too bold, while others would adopt strategies that were not bold enough. In addition, perceptual errors within an organization could conceivably cancel each other out, thus creating no problems at all.

This paper investigates the directional impact of cognitive biases on strategy. It is suggested that a number of factors combine to inflate the perception of environmental predictability. Thus, rather than the distortions being normally distributed around an accurate perception of environmental uncertainty, it is suggested that distortions will be systematically biased in the direction of overestimation of environmental predictability. As a result, strategies will rely too much on foresight and be prone to failure due to a lack of flexibility needed to deal with unforeseen circumstances.

This paper begins with a discussion of environmental uncertainty and strategy. A model of the impact of cognitive factors on the perception of environmental uncertainty and strategy is then introduced, followed by discussion of organizational and environmental factors that affect the relationship. The paper closes with a discussion of managerial and research implications.

Environmental Uncertainty and Strategy Alignment

Milliken (1987) defined uncertainty as "an individual's perceived inability to predict something accurately" (p. 136). Note that as uncertainty is reduced, the ability to predict is increased. Uncertainty and predictability are thus complements.

The term 'environmental uncertainty' suggests that the source of uncertainty is the organizational environment (Milliken, 1987). The complement of environmental uncertainty is environmental predictability. To the degree that environmental uncertainty is reduced, environmental predictability increases, and vice versa.

When environments are relatively predictable, decision-makers should be able to identify the critical variables affecting the organization and understand the cause and effect relationships amongst those variables (Fredrickson, 1984). Strategy can be made more precise to allow "choices to be made at the margin" (p. 460) and to enable allocation of specialized resources directly suited to the task. As such, strategies can be tailored to fit expected circumstances.

When environments are unpredictable, adaptive

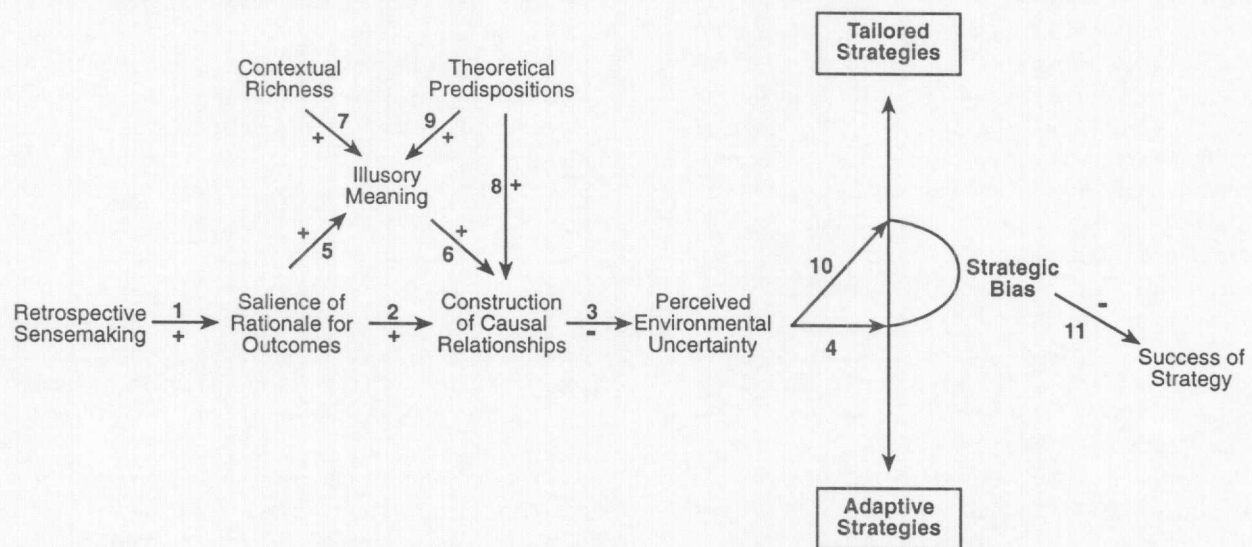
strategies are needed (Fredrickson, 1983). In essence, the tradeoff is between prediction and adaptation. When one can predict accurately, resources should be configured to take advantage of the predictions. When one cannot predict accurately, resources and capabilities should be configured to respond to situations as they arise.

Most situations are neither predictable nor unpredictable, but a blend of the two. Thus, strategic responses need to blend detailed strategy with flexibility. As environmental uncertainty increases, organizations need to be more flexible to facilitate adaptiveness. Flexible organizations possess some or all of the following resources or capabilities: (a) rapid decision-making processes, enabling strategies to be developed and enacted quickly as opportunities arise or delayed until risk is reduced without having to forego options; (b) a functionally flexible workforce, enabling rapid shifts in focus to be effectively implemented; (c) flexible production processes, enabling economies of scale to be achieved while producing a variety of products, thus enhancing the ability to adapt to unforeseen change;¹ and (d) liquidity in the form of short-term assets or unused debt-capacity, enabling opportunities to be acted upon quickly.

While the advantages of flexibility appear obvious, they are costly; these costs should be borne only when necessary. If an environment is relatively predictable and key decision-makers perceive it to be unpredictable, unnecessary costs will be incurred by the organization as it maintains the flexibility needed for adaptability (Hannan & Freeman, 1977; Milliken, 1987). Action may be needlessly delayed (options held) to ensure flexibility, thereby eliminating optimization opportunities.

On the other hand, if the environment is perceived as more predictable than it is, strategies will be tailored to take advantage of the perceived predictability. The planning objective is likely to be skewed towards optimization and early, pre-emptive action (Anderson & Paine, 1975; Bowman & Hurry, 1993). The perception of predictability will lead decision-makers to place less emphasis on environmental scanning, thus reducing awareness of and increasing vulnerability to environmental change (Milliken, 1987). Early specification of strategy may enable powerful coalitions with a stake in the specified strategy to form within the organization, and significant changes perceived as not being in their interest may be blocked (Thompson, 1967; Wrapp, 1967). When commitment to a course of action is made too far in advance, feedback on market conditions and technological changes will be underused (March, 1978; Quinn, 1980). As a result, strategy becomes inappropriately rigid and performance ultimately suffers (Priem, 1994; Quinn, 1978).

Figure 1.
Cognitive Model of Strategic Bias.



Factors Affecting the Perception of Environmental Uncertainty

Decision-makers facing a rich body of information usually begin by simplifying and ordering the data into mental models of the causal relations through a process of retrospective sense-making. The formation and updating of mental models is the primary mechanism for inductive learning (Hawkins & Hastie, 1990). However, as a side-effect, retrospective sense-making produces a perception of a world more orderly than it is (Weick, 1979). In retrospect, we recall the actual outcome of most situations as more predictable than they really seemed in prospect (Fischhoff, 1975, 1977, 1982; Fischhoff & Beyth, 1975). In general, we see outcomes as less surprising and believe they were relatively more predictable in foresight. Fischhoff (1975) labelled this effect 'hindsight bias.'

In a meta-analysis of 120 studies of hindsight bias, Christensen-Szalanski and Fobian Willham (1991) concluded that hindsight effects were wide-ranging and robust but not necessarily problematic, since shifts in subjective probability assessments were often not large enough to affect decisions. (Whether the shift had an effect was dependent on the sensitivity analysis particular to each situation.) For very rare and/or difficult-to-predict events, there are sometimes no hindsight effects (Mazursky & Ofir, 1990). The fall of the Berlin Wall, the collapse of Communism and the Asian economic crisis may be examples of such events.

Our interest here is less with the effect of specific

individual events than with the heightened sense of order created by hindsight bias. The perception of relative inevitability in past events—"creeping determinism," as Fischhoff described it (1982, p. 342)—may lead to the expectation that the future will unfold in as predictable a manner. For strategic managers, this may create an expectation that the relevant task is to correctly anticipate the future. This expectation is evident in the following statement by Hamel and Prahalad (1994): "The trick is to see the future before it arrives. The challenge in competing for industry foresight is to create hindsight in advance" (pp. 73, 81). The problem with this thinking is that in emphasizing the importance of foresight in strategy, the role of adaptiveness may be neglected, leading to a misalignment of strategy with the environment. This shift in alignment is referred to here as 'strategic bias.'

Model development

Figure 1 shows a cognitive model of strategic bias. The numbers in the figure correspond to the numbers in parentheses in the text below.

When making subjective probability estimates of the likelihood of a scenario or event, decision-makers are influenced by its 'availability' in memory (Tversky & Kahneman, 1982b). That is, the ease with which a scenario or event can be called to mind increases the subjective probability estimates of its likelihood (Ross & Sicoly, 1982). In addition, the availability of a scenario is directly related to its relative salience; as salience of a scenario increases, so too does its availability, thus

increasing the subjective probability estimate of its occurrence.²

Harris (1994) suggested that the most salient schemas are cued when sense-making activities are performed. In retrospect, the salience of an actual outcome and the rationale for why the outcome occurred dominate the salience of the other outcomes thought possible in foresight (1) (Connolly & Bukszar, 1990; Slovic & Fischhoff, 1977). Attributions of cause and effect relationships are constructed from these salient schemas (2), then used to make sense of the future (Corner, Kinicki, & Keats, 1994). Identification of cause and effect relationships in the organizational environment reduces perceived environmental uncertainty (3). Strategy formulation, containing a blend of *tailored* and *adaptive* components, is based on this perception of uncertainty. In Figure 1, a strategy is shown as a point on a continuum based on the perceived environmental uncertainty (4). The continuum covers a range of strategies with relatively pure forms of 'tailored' and 'adaptive' strategies as end-points.

Note, however, that for the perception of environmental uncertainty to be accurate and the ensuing strategies suited to the environment, the construction of cause and effect relationships needs to be accurate. The problem is that when viewing past outcomes, both naïve and trained decision-makers tend to perceive patterns where none exist, thus creating illusory meaning (5) (Gilovich, Vallone, & Tversky, 1985; Malkiel, 1973; Simon & Sumner, 1968).³ Kahneman and Tversky (1972) noted that in hindsight even random events are seen as orderly. To decision-makers unfamiliar with its properties, randomness appears as a tendency to cluster (Feller, 1968; Hogarth, 1980). Even when valid, relationships may evolve or change as time passes, making predictions based on past relationships prone to error (Kahneman & Tversky, 1973). Thus, our mental construction of cause and effect relationships will contain illusory cause/effect attributions as well as accurate ones (6). The combination of illusory and accurate attributions produces an inflated perception of order that ripples through the model, reducing perceived environmental uncertainty.

Contextual richness, common in strategic management settings, does not constrain the creation of illusory meaning. Rather, it expands the number of explanations possible (Weick, 1979) and enhances their credibility (7). Tversky and Kahneman (1982a) found that adding detail to a scenario enhances its plausibility by increasing its representativeness, in a sense making it appear more real. Pennington (1981) found that more detailed descriptions elicited stronger hindsight effects. As such, contextual richness is directly related to illusory meaning; as contextual richness increases, so too does illusory meaning.

Decision-makers do not enter into the sense-making endeavour with a clean slate. They bring a set of theoretical predispositions that enter the process as a mediating variable. Theoretical predispositions greatly aid our understanding of events and the construction of cause/effect attributions, keeping us from having to re-invent the wheel at every decision-making juncture (8). However, when theoretical predispositions are present, illusory meaning also increases (9) (Chapman & Chapman, 1971). In a series of experiments, Jennings, Amabile, and Ross (1982) found that in the absence of a theoretical basis, decision-makers required a strong relationship between variables ($r = .7$) to perceive a low-level relationship ($r = .3$), but when given a theoretical basis, a low-level relationship ($r = .3$) sustained a clearly perceived correlation ($r = .7$). In a sense, theoretical predispositions lead decision-makers to overinterpret the data at hand.

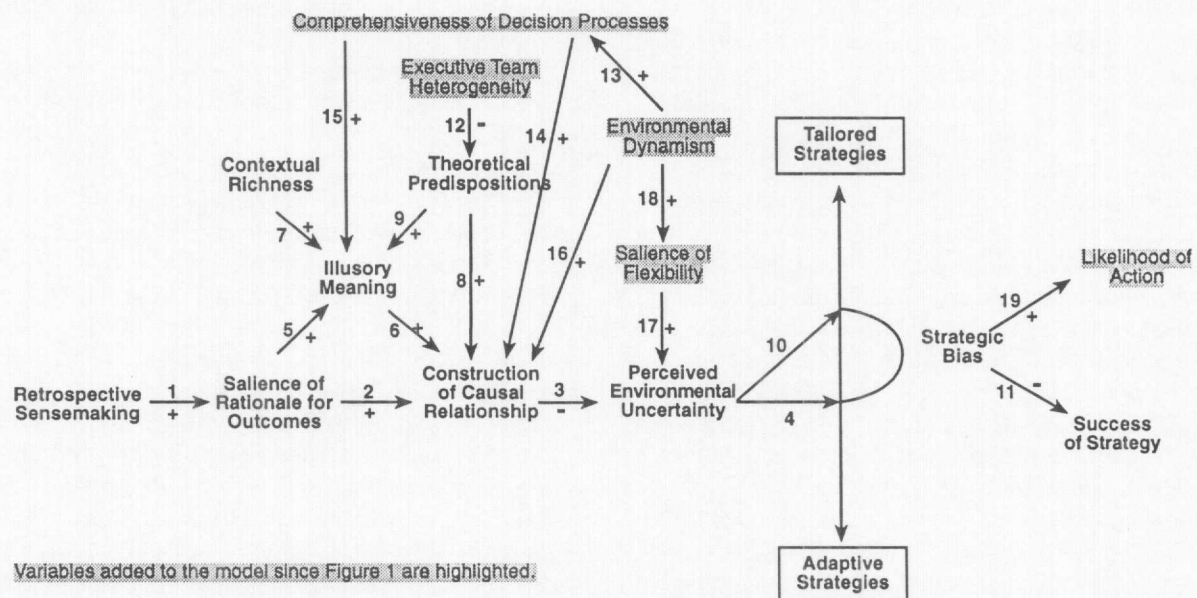
The process of inductive learning described in the preceding paragraphs produces a gap between perceived and actual environmental uncertainty, with perceived uncertainty being lower than actual uncertainty. In other words, environments are perceived as more predictable than they actually are. The result is a corresponding shift away from more adaptive strategies towards tailored strategies—strategic bias. In Figure 1, strategic bias is shown as a shift on the strategy continuum towards the end-point anchored at tailored strategies, with the size of the shift corresponding to the magnitude of the difference between perceived and actual environmental uncertainty (10).

In summary, retrospective sense-making leads strategic decision-makers to perceive illusory cause and effect relationships between variables in the past. These relationships are included in the construction of cause and effect relationships used to estimate environmental uncertainty. Their use leads decision-makers to underestimate the uncertainty of the environment, thereby overestimating its predictability. As a result, greater emphasis is placed on strategies designed to take advantage of the perceived predictability. A misalignment between an organization's strategy and its environment will result, ultimately degrading performance (11).

Organizational and Environmental Factors Affecting Strategic Bias

Having specified a cognitive model, the next step is to examine organizational and environmental factors affecting strategic bias. Specifically, the effects of the following factors will be considered: executive team composition, decision process, environmental dynamism, and salience of flexibility in attributions of

Figure 2.
Model of Strategic Bias.



success. Figure 2 includes these variables in an expanded version of Figure 1. As before, the numbers in the figure correspond with the numbers in the text below.

Executive Team Composition Effects on Strategic Bias

Strategic decisions are typically made by executive teams. Team composition may affect strategic bias. To date, very little research has been done on the susceptibility of groups to hindsight effects. Bukszar and Connolly (1988) found hindsight effects to be unchanged by group discussion; Stahlberg, Eller, Maass, and Frey (1995) found only a modest reduction in hindsight effects amongst groups. However, while both the individual members of a group and the group itself may suffer from hindsight effects, group composition may nonetheless have moderating effects on strategic bias.

To the degree that group composition is heterogeneous in terms of training, cognitive style, or demographic/cultural variables, individual members may differ with respect to the scenarios each uses to explain an outcome (Bantel & Jackson, 1989; Hurst, Rush, & White, 1989; Murray, 1989). As a result, they may hold different theoretical predispositions when attempting to make sense of the future. Variance among these predispositions may affect the construction of causal relationships, increasing the likelihood that nonsupporting evi-

dence will be included in the overall analysis and thus reducing overconfidence in the perceived predictability of the environment (12). In general, overconfidence occurs when a decision-maker evaluates a prediction by considering the supporting evidence for one's prediction disproportionately to the reasons why the prediction could be wrong (Koriat, Lichtenstein, & Fischhoff, 1980; Sniezek, Paese, & Switzer, 1990).

Bukszar (1999) conducted an initial test of this hypothesis, and the results suggested that to be successful, moderation of hindsight effects may require more formal procedures such as dialectic approaches, since the mere presence of group heterogeneity was insufficient to ensure that nonsupporting evidence was fully considered. This much said, group heterogeneity, when adequately utilized, is hypothesized to have a moderating effect, thus reducing strategic bias.

The Relationship Between Strategy and Process

An element of contingency theory in strategic management suggests that the comprehensiveness of process should vary depending on environmental predictability. The perspective can be summarized as follows: in predictable environments, synoptic processes should be used, whereas in unpredictable environments, incremental processes should be adopted (Fredrickson, 1983).

Synoptic processes involve the systematic comparison of the costs and benefits of alternatives, based on far-reaching information from a variety of sources, with the ultimate goal of selecting the most effective course of action in the most timely manner (Etzioni, 1989; Fredrickson, 1984). Under an incremental approach, organizations formulate strategy by establishing broad goals, to be achieved incrementally using decentralized decision-making to ensure adequate flexibility and adaptiveness to feedback (Quinn, 1980). Decentralization increases the number of active boundary spanners, which has a positive relationship on the perception of environmental change (Milliken, 1990). Decisions are delayed to take advantage of the most up-to-date information and to allow organizations to act opportunistically.

Incrementalism often conjures up images of directionless muddling. However, advances since Lindblom's (1959) original formulation have prescribed methods for enhancing the directedness of incrementalism. Quinn's (1980) *logical incrementalism* emphasized goal directedness in incrementalism. Hamel and Prahalad's (1989) notion of *strategic intent*, as a simple rallying cry, provides improved awareness of organizational goals throughout the organization, enabling strategy-enhancing choices to be made consistently at all levels in the organization as opportunities arise.

The relationship between strategy and process can be mutually facilitating. That is, in predictable environments the desire to develop tailored strategies may lead to the adoption of a synoptic approach. As well, the utilization of a synoptic approach may lead to the development of relatively tailored strategies. Similarly, in unpredictable environments the desire to develop adaptive strategies may lead to the selection of an incremental approach, and the utilization of an incremental approach may lead to the development of adaptive strategies. However, the relationship between strategy and process is not one-to-one, as is borne out in empirical studies that show contradictory findings.

Support for contingency theory has been found in a number of studies (Fredrickson, 1984; Fredrickson & Iaquinto, 1989; Fredrickson & Mitchell, 1984; Priem, 1994). However, in a study of decision-making in high-velocity environments, where contingency theory would lead us to expect to see incremental processes in use, Eisenhardt found that the most successful firms used more comprehensive approaches with centralized decision processes (Bourgeois & Eisenhardt, 1988; Eisenhardt, 1989; Eisenhardt & Bourgeois, 1988). Furthermore, Judge and Miller (1991) found that more comprehensive approaches to strategy were associated with high performance in the biotech industry, but were not related to performance in more stable industries.

One reason more comprehensive approaches had

been thought to be poorly suited to high-velocity environments was that they slowed the decision-making process. However, Judge and Miller (1991) suggested that the use of more comprehensive approaches need not necessarily slow decision-making. They, like Eisenhardt before them, found that decisions can be made more quickly when alternatives are considered simultaneously rather than sequentially (a variation of the old adage that if you want something done quickly, give it to someone who is busy).

Miller and Friesen (1983) found that increases in environmental dynamism are accompanied by greater levels of rationality in the planning process. Extending these results, Glick, Miller, and Huber (1993) found rationality in strategic process to be positively related to performance in dynamic environments. Finally, Priem, Rasheed, and Koluvcic (1995), in a survey of manufacturers, found process rationality to be positively related to performance in dynamic environments. At this juncture, it appears the balance of evidence supports the notion that environmental dynamism leads to greater comprehensiveness in strategic decision processes (13).

The apparent contradictions in findings may be rooted in the logical contradictions inherent in the theory itself. The utilization of a synoptic approach should indeed be enhanced in stable environments where detailed contingency planning can be more easily performed. Undoubtedly, some firms in stable environments use just such a synoptic approach to develop strategies.

However, low levels of environmental uncertainty reduce the need for environmental scanning (Milliken, 1987, 1990), and experience/familiarity with the environment may reduce the need for analysis, enabling suitable strategies to be developed with nonsynoptic approaches. Experience and familiarity also reduce the need for contingency planning, as adaptation can be made reasonably quickly as needed. In essence, there is a cost-benefit tradeoff. Why go through the effort of developing contingency plans when they may not be necessary, and if they are, suitable adaptations can be made on-the-fly? Mintzberg and Waters (1982) characterized strategy in stable environments as a process of fine-tuning, with only a periodic need for in-depth analysis and re-adjustment. On balance, it is not clear that the utilization of a synoptic process will lead to superior performance in stable environments.

On the other hand, rapid change inherent in dynamic environments reduces domain familiarity, which may necessitate scanning and extensive analysis to gain some sense of the level of environmental uncertainty. In addition, firms in uncertain environments may have more differentiated structures that mirror environmental uncertainties. As a result, they need more sophisticated integrative devices to coordinate strategy (Burns &

Stalker, 1961; Lumpkin & Dess, 1995; Miller, 1993; Powell, 1992). Thus organizations may use more comprehensive approaches without specifying either precise strategies or contingency plans. For example, in the Eisenhardt study (1989), firms used relatively comprehensive approaches but developed adaptive strategies. Their centralized/collaborative decisional processes facilitated rapid decision-making and thus organizational adaptability.

Contradictions aside, a synoptic approach to strategy is likely to be more susceptible to strategic bias than an incremental approach. As the comprehensiveness of the strategic process increases, so too do efforts to make cause-and-effect relationships in the environment more explicit (14). As before, the mental construction of cause-and-effect relationships will contain both accurate and illusory attributions (15). The combination of accurate and illusory attributions produces an inflated perception of order, which reduces perceived environmental uncertainty.

Environmental Dynamism

All foresight is susceptible to strategic bias and, as Hamel and Prahalad indicated (1994), "unpredictable and turbulent change can come to any industry today" (p. 37). However, while strategic bias occurs in all environments, it is more pronounced in dynamic environments. Environmental dynamism refers to the rate of change, the absence of pattern, and the unpredictability of environments (Dess & Beard, 1984). Essentially, in dynamic environments there are more opportunities for strategic bias to be a problem (it will occur more frequently) and shorter intervals between occurrences for adaptive learning to be corrective (the negative effects will be more severe)(16). Thus, in general, strategic bias is expected to be a greater problem as dynamism increases.

In environments characterized by low dynamism, a significant and unpredictable change may cause a substantial disruption. However, given the relative stability between change episodes, decision-makers have the opportunity to adapt strategies over time, thus reducing the impact of strategic bias. This advantage may be tempered, however, because decision-makers operating in environments where change has been rare may find successful adaptation difficult, since they may be inexperienced with change implementation and their knowledge of how to proceed may be underdeveloped (Lant, Miliken, & Batra, 1992).

The Salience of Flexibility in Successful Strategies

Flexibility may be criticized even in successful firms because its added costs may be seen as an unne-

cessary drag on performance given the relative predictability, in hindsight, of outcomes. This will depend on the degree to which flexibility is perceived to have been necessary to the success of the strategy. The greater the salience of flexibility in producing success, the less the pressure will be to reduce it in the future. As such, the salience of flexibility will have a direct effect on perceived environmental uncertainty; as the salience of flexibility in past successes increases, so too will the perception of environmental uncertainty, thereby reducing strategic bias (17).

However, the salience of flexibility in success stories is likely to be lowered in retrospective accounts as the success produced from a series of actions takes on the look of a consistent line, skewing explanations towards 'purposive rationality' (Pascale, 1992; Weick, 1984). As a result, foresight explanations for success are likely to be exaggerated. As well, functional flexibility and decision speed can make a decision-maker appear more visionary. For example, Robert E. Lee, a Confederate general during the U.S. Civil War, is widely regarded as having been a brilliant strategist. Without taking anything away from his well-deserved reputation, Lee's strategies were facilitated by the quickness with which his decisions could be implemented, as in the case of the battle of Chancellorsville where he was able to launch a successful offensive against an opponent twice his size by splitting his forces and performing a rapid flanking manoeuvre (Smith, 1888). In hindsight, rapid decision-making and implementation can make foresight appear more crucial than it may have been.

In truly dynamic environments, Silicon Valley for example, the salience of flexibility may actually stand out (18). As noted earlier, hindsight bias is absent for very rare or difficult-to-predict events, like the fall of the Berlin Wall. In corresponding strategic situations, it may well be that it is the salience of flexibility that stands out rather than the belief that outcomes were predictable.

Offsetting Benefits: Increased Likelihood of Action

Strategic bias may have positive effects as well, particularly in highly uncertain environments, in that the overconfidence associated with strategic bias may lead to a greater willingness on the part of decision-makers to act and persist with action, offsetting timidity (19). Indeed, strategic bias may hold considerable descriptive validity for entrepreneurial activity. It could help to explain the boldness and persistence of entrepreneurs, as well as their relatively high failure rates.

In highly uncertain environments, the risks associated with action, although hard to specify, are nonetheless particularly salient. In general, people are risk-averse (Kahneman & Lovallo, 1993).⁴ According to prospect theory, the evaluative weights attached to potential loss-

es are typically at least twice as great as the weights attached to potential gains (Kahneman & Tversky, 1979; Tversky & Kahneman, 1991). An aversion to losses strongly "favours the avoidance of risks" and "favours inaction over action and the status quo over any alternatives" (Kahneman & Lovallo, p. 18). Loss aversion in highly uncertain environments may lead to extreme timidity in decision-making.

Weick (1979, 1984) suggested that there are benefits to planning when dealing with uncertainty in that the course of action designated by a plan fosters a unified, coordinated approach. This increases the likelihood of action since action is more likely in "sensible" situations (1984, p. 47). In a similar vein, Kahneman and Lovallo (1993) suggested that decision-makers tend to be timid when making choices but bold when making forecasts. Accordingly, the bold forecasts that result from overconfidence help offset the propensity for timid behaviour, acting in a sense as an offsetting error. Thus, strategic bias in highly uncertain environments may aid organizations by facilitating action when they might otherwise be paralyzed by uncertainty. A strategic misfire may be less problematic than not firing at all, provided that strategies can be adapted over time (keeping in mind that the strategic bias that leads to action is also likely to lead to less adaptiveness in the firm's strategy).

Summary

Organizational and environmental factors can combine to form a wide range of influences on strategic bias, not all of which are necessarily problematic. For example, in truly dynamic environments where action may be difficult to initiate, uncertainty may create the need for a more comprehensive approach to strategy, accompanied by a dose of strategic bias that offsets risk and facilitates action. Yet even with a more comprehensive approach, the level of environmental uncertainty may be so great that retrospective sense-making does not distort the perceived value of flexibility. Strategies may be developed that prescribe organizational adaptiveness.

Other combinations of organizational and environmental influences may be less benign. The question of how these factors actually combine is best answered empirically. On balance though, strategic bias is expected to degrade organizational performance as firms underinvest in flexibility.

Learning from Feedback: Is Strategic Bias Self-Correcting?

In principle, organizations should learn to value flexibility and develop more adaptive strategies when

previous strategies have encountered difficulties due to a lack of flexibility. This depends on the degree to which decision-makers attribute difficulties to a lack of strategic flexibility or to other factors. It also depends on the degree of difficulty encountered. There is reason to believe that learning the right lessons in strategic settings may be elusive, and that even when they are learned, they may require relearning from time to time.

As indicated earlier, flexibility may be undervalued in attributions of success. To the degree that the success of competitors is seen as due to tailored strategies, the expectation that tailored strategies are appropriate will be reinforced, even in the face of one's own difficulties. In this case, difficulties may be attributed to faulty specification or poor implementation of strategy, rather than to a lack of flexibility.

Sitkin (1992) suggested that learning is facilitated when corrective actions take place in familiar domains with short feedback cycles. Short feedback cycles enable successful changes to be noticed, while familiarity with the domain enhances the decision-maker's ability to understand the reasons for outcomes. Such circumstances may facilitate proper attributions and a correction of strategic bias.

However, strategic decisions are characterized by their novelty and open-endedness (Mintzberg, Raisinghani, & Theoret, 1976). As a result, feedback on strategic decisions is plagued by a number of factors. First, there is a continuous small-numbers problem; the relevance of an outcome from one setting may not be applicable to other settings because of the differences in structure from one setting to another. Categorization of strategic decisions requires a large number of classes with only a few instances in each class, thus limiting the generalizability of the patterns discerned in any particular situation. Second, extended time-lags between decisions and outcomes negatively impact learning (Brehmer, 1990; Diehl & Serman, 1995; Serman, 1989) and cause information to be obsolete in rapidly changing environments (Eisenhardt, 1989). Third, the complexity of the problem/environment increases the difficulty of attributing an outcome to a particular action and may lead to superstitious learning (Barr, Stimpert, & Huff, 1992; Einhorn, 1980; Einhorn & Hogarth, 1978). Fourth, the mutual exclusivity of decision enactment limits a decision-maker's ability to see what would have occurred had another decision been implemented (Tversky & Kahneman, 1986). As a result, learning from feedback in strategic settings may be difficult to achieve, making the correction of strategic bias more problematic.

While failure draws managerial attention, the size of failure matters (Sitkin, 1992). In a study of bankruptcy at major firms, Hambrick and D'Aveni (1988) found that significant failure produced a paralysis in about one third

of the firms in their sample while the other two thirds responded with large-scale and relatively frequent changes, apparently in the hope of breaking out of their downward spiral. They suggested that the large-scale changes are the result of risk-seeking behaviour due to framing effects (Kahneman & Tversky, 1979), which are exacerbated by higher proportions of debt in the firm's capital structure due to the previous failure (Black & Scholes, 1973). Under such conditions, change is likely to be of a 'go-for-broke' nature (Hambrick & D'Aveni, 1988) as opposed to focussing on enhancement of flexibility, which reduces the likelihood that such change will diminish strategic bias.

Major failures affect the firm's financial condition, making the cost of existing flexibility harder to bear (Hambrick & D'Aveni, 1988). Adaptation requiring increased flexibility will be less likely, although in some circumstances functional flexibility could be stimulated by resource shortages as organizations are forced to put people into unfamiliar roles, bringing latent skills to the surface. The adjustments following relatively minor failures may be more productive, as small failures capture attention but avoid threat-induced truncation of explorative activity (March, 1991; Sitkin, 1992) or the desperate actions noted by Hambrick and D'Aveni.

Implications

Strategic bias affects the balance of foresight and adaptability in strategy, tilting the scales towards foresight. Returning the balance may be advisable. Decision-makers should not abandon their efforts at developing foresight; rather they should de-emphasize it. In essence, this paper suggests that strategists should proactively design organizations with better reactive capabilities and then take steps to ensure that the value of flexibility in producing success is recognized.

Accurate foresight is clearly beneficial, and examples of successes based on foresight are legion. Exxon's phenomenal cash flows today are largely the result of decisions made by a CEO who correctly anticipated the power of OPEC in the 1970s. His foresight led to the radical decision to explore for oil in the 1960s, when oil was both cheap and plentiful (Thompson, 1990). As well, many variables have been shown to facilitate foresight. For example, Porter (1990) suggested that sophisticated buyers, (e.g., teaching hospitals) may act as leading indicators of demand for a much broader group of customers.

However, overreliance on foresight creates unnecessary risks. Executives at General Motors correctly identified the popularity of two-seat, inexpensive sports cars when they introduced the Fiero, but the continued

reliance on foresight led to failure and withdrawal from the market when they were unable to predict the modifications necessary to stay competitive. On the other hand, confronting uncertainty with a focus on decision speed rather than foresight enabled Toyota and Honda to quickly modify their models and react to, rather than anticipate, demand. A focus on production flexibility enabled Mazda to enter the same market segment that GM was exiting. Mazda was able to enter this segment with lower sales expectations than GM had already achieved but found inadequate to sustain a profit.⁵

The most critical need for foresight may be to anticipate fundamental trends, after which adaptation may become more critical. Exploratory behaviour may help to facilitate insights into otherwise difficult-to-perceive trends through the creation of shadow-options,⁶ which might enable strategic direction to emerge. For example, General Motors could take advantage of the sheer number of models it produces by creating greater variety in its models, then using flexible manufacturing to shift production to styles that attract the greatest response. Advances in information technology and manufacturing processes should make approaches like this increasingly viable.

A similar approach may be particularly well suited to rapidly changing, technology-based industries. A firm may wish to place multiple bets to increase the likelihood of discovering viable solutions. Once found, the weight of the organization can be shifted to exploit it. For example, Lucent, with its ownership of AG Communication Systems (a smaller producer of telephone switches), is able to invest in multiple approaches, thereby reducing the risk of missed opportunities in its highly dynamic environment.

Of course, the tendency of decision-makers to downplay the importance of flexibility in producing success could also be used to one's advantage. By intentionally de-emphasizing the importance of flexibility and stressing the role of foresight in the production of success, one could hide the importance of flexibility. As such, rivals may underinvest in flexibility and attempt instead to build strategies based on superior foresight.

Research Implications

The propositions put forward in this paper suggest that cognitive biases have systematic effects on strategy. Identification of systematic effects is critical to the advancement of knowledge of how decision heuristics and biases affect strategy. The sheer number of potential pitfalls that may result due to the use of heuristics can overwhelm decision-makers. Yet decisions need to be made. Without an identification of systematic effects, the problems created by the use of decision heuristics would

be seen as differing on a case-by-case basis, making them more intractable in total, but less of a concern overall. This is because the temptation for managers and researchers alike would be to assume that a certain amount of bias is inevitable, discount it, and move on. Systematic effects alert decision-makers as to what, in particular, to be wary of, after which steps can be taken to avoid or reduce the problem. Future research should focus more on the systematic effects of cognitive bias on strategic management. Hopefully this paper stimulates such efforts.

In this vein, one avenue to explore may be the effects of cognitive bias on organizational structure. This paper has explored the links between cognitive bias and strategy formation. The effects of cognitive bias on strategy implementation could have implications for organizational structure. It may be that the difficulties involved in the implementation of a strategy will be underestimated due to the difficulty involved in imagining the many ways in which an implementation can fail, leading to numerous unanticipated miscues, small and large. However, in hindsight, implementation failures are likely seen as having been obvious, thus reflecting badly on implementation managers. This may result in an overly aggressive policing of managerial discretion in the implementation of strategy, biasing decision-making structures towards more centralized, less autonomous forms that may restrict the organization's ability to adapt to difficulties. This is a complex area of study, and the preceding sketch of a possible linkage clearly oversimplifies it. Nonetheless, it poses interesting possibilities for further theory development linking cognitive biases, organizational theory, agency theory, and strategic management.

While the primary contribution of this paper is to clarify the role of cognitive bias on the development of strategy, it may also help clarify the relationship between strategy and process in contingency theory. Research on contingency theory has focused to a considerable degree on how decision processes should vary depending on environmental uncertainty, and to a lesser degree so on how strategies should vary. This research has led to valuable insights and enriched our understanding of the role of decision process in strategic management. However, the findings have also created controversy regarding the normative nature of the recommendations for strategic process and environmental uncertainty. As a result, the accuracy of contingency theory in strategic management, and thus its suitability as normative theory, has been questioned (Eisenhardt, 1989).

Here it is argued that strategy and process should not be expected to vary on a one-to-one basis. Specifically, in stable environments suitable tailored strategies can be developed without use of a synoptic approach,

and in unstable environments a more comprehensive approach may facilitate a better understanding of the level of environmental uncertainty, thus paving the way for adaptive strategies to be implemented. This is contrary to the relationship originally advanced. Findings regarding the type of strategic process in place should not be expected to correspond exactly with the degree of specificity in the strategy developed. Expecting it to do so oversimplifies the role of process in the development of strategy.

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Notes

1. For example, Mazda's ability to produce a minivan and sports car on the same assembly line reduces the minimum efficient scale required for each vehicle, enabling market entry at lower volumes and providing flexibility in meeting demand for each vehicle.
2. For example, the salience of a decision-maker's plan is greater than the salience of the plans of others to that decision-maker (Ross & Sicoly, 1982). Zajac and Bazerman (1991) suggested that strategic decision-makers underestimate the role of the contingency decisions of competitors due to their relative lack of availability, which leads to chronic overcapacity problems on an industry level and excess payments in acquisitions and mergers.
3. Retrospective sense-making is a process, and illusory meaning is a possible outcome of this process. Hindsight bias is a form of illusory meaning, but a relatively simple form involving the levels of single variables, whereas illusory meaning is meant to connote a more complex web or relationship among variables.
4. People are generally risk-seeking in the domain of losses (Kahneman & Tversky, 1979).
5. The provision of these cases may itself be an example of hindsight bias. Nonetheless, it is useful to provide some salient examples of strategies that were successful because of flexibility.
6. Shadow options are options that become apparent only after experience enables tacit knowledge to be made explicit (Hurry, Miller, & Bowman, 1992; Nonaka, 1991, 1994).