

THE PSYCHOLOGICAL CONTEXT OF STRATEGIC DECISIONS: A MODEL AND CONVERGENT EXPERIMENTAL FINDINGS

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Strategic decision-makers typically are involved in a series of incremental decisions, each affected by a variety of contextual factors. This paper develops a model of the psychological context of strategic decisions and reports two experiments. First, students made reinvestment decisions faced with success or failure feedback on a past decision, high or low perceived organizational slack, and decisions framed to depict a positive or negative future outlook. All three variables had main and interactive effects. Second, managers made similar decisions in a related experimental design. Results confirmed and extended the initial findings. Implications and directions for future research are discussed.

Managerial decisions are made by individuals or groups that confront an array of situational and psychological influences. They are not impersonal or isolated events. The decision-making process is dependent not only on objective information and rationality, but also on decision-makers' cognitions about the world (Anderson and Paine, 1975; Das, 1986; Mitchell, Rediker and Beach, 1986; Simon, 1976; Weick, 1979).

Moreover, each managerial decision typically is an episode in a series of decisions. Organization strategy, for instance, arises through a stream of decisions and reflects an aggregate pattern of behaviors that occur over time (Fredrickson, 1983; Hofer and Schendel, 1978). This view indicates that, in many instances, strategy represents a composite of sequential decisions, and leads Fredrickson to recommend that strategic process researchers should 'adopt a decision making perspective (as opposed to a planning one) and concentrate their efforts on developing and utilizing methodologies that study how organizations make and combine individual strategic decisions' (1983: 571). This perspective is supported further by the theoretical arguments of Mintzberg (1978), Quinn (1980), and Bourgeois

(1980), who treat strategy formulation as a decision-making process.

This paper attempts to build on this view of the strategic formulation process as a series of decisions by developing and testing a model of contextual influences on strategic decisions. The model rests on two related assumptions. First, the model adopts an incremental perspective of strategy formulation. Strategic decisions are not discrete and independent of one another; rather, they represent steps in an overall process designed to move the organization further toward a goal or set of goals embraced by the strategic decision-makers.

Second, strategic decisions are shaped by a variety of contextual influences arising from past events, present circumstances, and perspectives on the future. For example, most decisions are embedded in a history (March, 1981; Mitchell, Rediker and Beach, 1986; Neustadt and May, 1986), and strategic decision-makers themselves have experienced success or failure with past decisions. Furthermore, decision-makers must examine current issues facing the firm such as organization resources and the competitive environment. Finally, strategic decision-makers

usually consider their goals and those of the organization, as well as their subjective evaluation of the future.

Thus, a given strategic decision is typically an episode in a series of incremental decisions that constitute the strategy of the organization. Like human behavior in general (Lewin, 1951), strategic decisions are influenced by forces and events in the past, the present, and those anticipated in the future. These forces and events combine to create the psychological context for each decision in the overall process.

The paper is divided into four major sections: (1) description of a model depicting the psychological context of strategic decisions; (2) a test of the model using a sample of undergraduate students in a laboratory setting; (3) a second, related study using a sample of practicing managers in the laboratory setting; and (4) summary and implications of the research for decision theory, research and practice.

MODEL DEVELOPMENT

The model described in this paper is designed to facilitate and to extend the implementation of a decision-based approach to strategic process research. The model identifies and incorporates potentially critical influences on strategic decisions. To achieve this end, the model is constructed by (1) extending current thinking within the strategic decision literature, and (2) adapting models and constructs from allied fields within the administrative sciences.

First, recent theory and research with an explicit emphasis on strategic decisions by Fredrickson (1984, 1985, 1986) and others (Barnes, 1984; Bourgeois, 1981; Duhaime and Grant, 1984; Dutton, Fahey and Narayanan, 1983; Fahey, 1981; Hambrick and Snow, 1977; Jemison, 1981; Litschert and Bonham, 1978; Mintzberg, Raisinghani and Theoret, 1976; Mintzberg and Waters, 1985; Shrivastava and Grant, 1985; Schwenk, 1984) suggest that strategic decisions and the processes that lead to them may be influenced by the context within which the decisions are made. The research reported here is interested primarily in the effects of decision-makers' psychological context on investment decisions.

Second, the research explicitly incorporates constructs from other decision research traditions that have been discussed in a strategic decision setting on a rather limited basis (Bourgeois, 1981; Fredrickson, 1985; Schwenk, 1986). The combined influence of these constructs has been examined only rarely or indirectly (Fredrickson, 1985; Whyte, 1986). This research attempts, therefore, to assess the possible contribution of these constructs to the evolving strategic decision literature.

The strategic decision model shown in Figure 1 depicts the confluence of psychological influences confronting decision-makers. Perceived past, present, and future considerations are assumed to coexist in the decision-maker's psychological field and to influence present behavior (Lewin, 1951). These psychological influences require simultaneous examination for their combined impacts on strategic decisions.

To operationalize and examine the unique and interactive effects of these influences, the present research integrates three major streams of decision-making research: escalation of commitment (Staw, 1981) organizational slack (Cyert and March, 1963), and decision framing (Kahneman and Tversky, 1984). These particular constructs were chosen for four reasons: (1) each has the potential to add to our understanding of strategic decision-making; (2) each is well established in its respective literature; (3) in combination, they are consistent with the assumption that strategic decision-making is an incremental process; and (4) each represents either the past, present, or future component of Figure 1. Thus, escalation of commitment occurs in response to success/failure feedback on a previous decision (past event). Perceived organizational slack is a major contributor to the current context within which the subsequent decision must be made (present conditions). Finally, decision frame concerns the psychological orientation of decision-makers regarding the prospects of future gains or losses (future outlook).

At a time when the literature on decision-making is highly fragmented, the simultaneous use of these three decision constructs has the added advantage of integrating three previously independent lines of research. However, no claim is made that these specific variables provide a comprehensive test of a general contextual model,

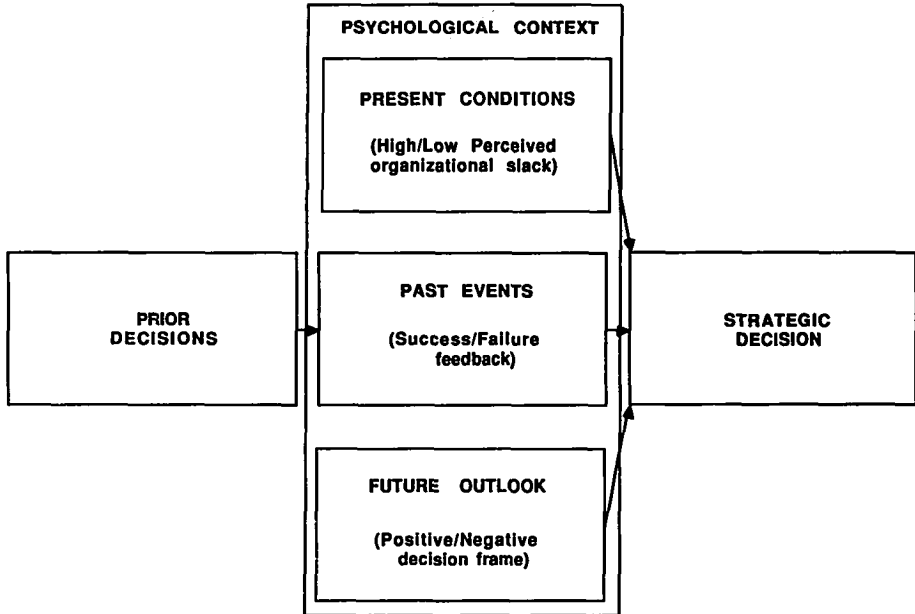


Figure 1. The psychological context of strategic decisions

or even that they are the most important or powerful factors in a decision-maker's psychological field. We undertook this research to examine the usefulness of a general approach, fully aware that subsequent theory and research may refine and modify the range and identity of the specific constructs that are most important. The following sections provide brief literature reviews of each of the three experimental variables, as well as the hypotheses relevant for the first study.

Decision feedback

The influence of past events is operationalized based on a body of research conducted by Staw and others that focuses on the escalation of commitment (Conlon and Wolf, 1980; Fox and Staw, 1979; Staw, 1976; Staw and Fox, 1977; Staw and Ross, 1978). These studies are built on the premise that the outcome (i.e. success or failure feedback) of an initial decision to commit resources to a course of action frequently influences subsequent decisions: whether to continue with the original course of action, and if so, whether to increase, maintain, or reduce the

initial level of support. Because strategic decisions are assumed to be incremental and, therefore, to depend at least to some extent on the success or failure of previous decisions, this construct seemed a suitable starting point for the model.

Staw (1981) summarized research on this effect, concluding that individuals have a tendency to escalate their commitment to a losing course of action, and that escalation commonly leads to further problems and losses. Although escalation of commitment may not occur when salient information regarding the probabilities of future outcomes is available to the decision-maker (Bateman, 1986; Staw and Fox, 1977), the escalation tendency may result in a poor and costly decision in the absence of clear predictive information.

Staw (1981) suggests that at least some of the tendency to escalate commitment may be explained by a motivation to self-justify, or to prove the rationality of the earlier decision. The decision-maker does not recognize psychologically that the previous investment is a sunk cost, and, therefore, the earlier decision may bias future decisions. This can interfere with prospec-

tive, economic rationality and mitigate the impact of more objective decision factors. In other words, the maximization of future utility assumed by traditional subjective expected utility models may be precluded as personal considerations exert their psychological influence.

Recently, Bazerman (1984) and Whyte (1986) offered prospect theory (Kahneman and Tversky, 1979, 1984) as an alternative explanation for escalation of commitment. This perspective suggests that the result of the initial decision influences the framing of the subsequent decision, and that this framing, rather than a self-justification motive, is what affects the reinvestment decision. In either case, decision feedback appears to have a psychological impact on the decision-maker, one that influences the subsequent decision.

This phenomenon clearly is pertinent to strategic decision-making. Staw states that:

prime candidates for escalation include resource allocation or investment decisions that are identified by an entering and exit value, . . . and policy decisions for which administrators are held accountable by others in an organization or by the general public (1981: 585).

Strategic decisions frequently involve investments and reinvestments in a particular project or organizational activity, making them subject to the escalation tendency. In addition, escalation emphasizes the relationships among decisions that are separated in real time, yet that are interdependent within the decision-maker's psychological field. The tendency to escalate in response to failure feedback may be a critical guiding factor in the pattern or stream of decisions that constitute organization strategy.

These considerations suggest the following hypothesis:

Hypothesis 1: Failure feedback from a past investment decision will lead to significantly higher levels of reinvestment than success feedback.

Organizational slack

Perceived organizational slack constitutes the second major construct in the research. Building

on the work of Cyert and March (1963), Bourgeois defines organizational slack as:

that cushion of actual or potential resources which allows an organization to adapt successfully to internal pressures for change in policy, as well as to initiate changes in strategy with respect to the external environment (1981: 30).

Bourgeois suggests that slack is a facilitator of certain types of strategic and creative behaviors within the organization, and concludes that one of the strategic functions of slack is to provide resources for new strategies, creativity, and innovative experimentation. Consistent with this logic, Baird and Thomas (1985) and Carter (1971) indicate that organizational slack should have a positive association with strategic risk-taking.

In the first experiment described below, the decision-makers are given a sum of money that they may reinvest in a current product division. The sum is identical in both the low-slack and high-slack conditions, but it is presented in such a way as to portray the sum as excess (high-slack) funds or severely limited (low-slack) funds. The decision-makers may reinvest all, a portion, or none of the funds in the existing division, with excess funds reverting to a general pool that may be used for new initiatives and other investments. If, in fact, slack provides resources for strategic creativity and innovation, then the decision-makers in the experiment may be expected to reserve high-slack resources for other activities rather than invest them in an ongoing project. As a result, low perceived organizational slack should yield a higher level of reinvestment.

The following hypothesis is offered:

Hypothesis 2: Low perceived organizational slack will lead to significantly higher levels of reinvestment than high perceived slack

Decision frame

The third major construct, decision frame, is drawn from behavioral decision theory in cognitive psychology (Kahneman and Tversky, 1984). The basic premise of framing is that the way in which decisions are presented influences the risk preference and behavior of the decision-maker. For example, McNeil, Pauker, Sox and Tversky

(1982) demonstrated that preferences of physicians and patients varied significantly when the probable outcomes of lung cancer therapies were described in terms of mortality or survival:

Surgery, unlike radiation therapy, entails a risk of death during treatment. As a consequence, the surgery option was relatively less attractive when the statistics of treatment outcomes were described in terms of mortality rather than in terms of survival (Kahneman and Tversky, 1984: 346).

Kahneman and Tversky suggest that framing is used commonly in the market-place and in the political arena. Thaler (1980) offers an example, noting that lobbyists for the credit card industry insisted that any price difference between cash and credit purchases be labeled a cash discount rather than a credit card surcharge:

The two labels frame the price difference as a gain or as a loss by implicitly designating either the lower or the higher price as normal. Because losses loom larger than gains, consumers are less likely to accept a surcharge than to forego a discount (Kahneman and Tversky, 1984: 346).

In the strategic decision literature, Dutton, Fahey, and Narayanan argue that 'the implications of the language and labels employed to express understanding of decision situations have been markedly neglected' (1983: 316). They note that issue labels and language may affect the level of risk-taking and commitment, and cite the framing research of Kahneman and Tversky. As suggested by Dutton *et al.* (1983), Fredrickson (1985) examined the effects of labeling decisions as problems or opportunities, finding a significant impact of this variable on the recommendations of a sample of MBAs. Whyte (1986) suggests that decision framing constitutes an important psychological mechanism behind escalation of commitment. This position is apparent in his recommendation that decision-makers may be able to overcome the escalation tendency by framing decisions in a variety of ways.

In the study reported below, future prospects phrased in terms of gain, including a goal orientation toward profit maximization, are contrasted with equivalent future prospects phrased

in terms of loss, including a goal orientation toward loss minimization. Objectively, differences in the phrasing of potential outcomes with the same probabilities, in terms of the likelihood of potential gains or the likelihood of potential losses, should not make a difference in the subsequent decision. However, decision frame is expected to have a direct, subjective impact on the decision. Specifically, a decision framed as a potential gain should be a more attractive option for reinvestment than a probabilistically equivalent option defined in terms of loss.

Hypothesis 3: A positive, gain-oriented decision frame will lead to significantly higher reinvestment levels than a negative, loss-oriented decision frame.

INTERACTION EFFECTS

Perhaps more interesting and important than the main effect hypotheses, decision frame is expected to have a differential impact on the subsequent decision depending on success/failure feedback and the level of perceived organization slack. This prediction is made for two reasons. First, some empirical results indicate that decision-makers are more responsive to information cues after a failure (Bateman, 1986; Staw and Ross, 1978). In the Staw and Ross (1978) study, subjects who received failure feedback were more sensitive to incoming information regarding whether the cause of the setback would persist than subjects who received success feedback. In the Bateman (1986) study, information about probabilities of future success was more likely to be used by subjects who had received negative feedback than by those who had received positive feedback. Thus, decision-makers in an adverse context, faced with the need to perform well on an upcoming decision, appear to be more responsive to incoming information than decision-makers in a context characterized by successful performance.

Second, a more fully-developed theoretical rationale exists for predicting interactive effects between decision frame and each of the other two variables. Kahneman and Tversky's (1979) prospect theory suggests that potential gains and losses are evaluated relative to a reference point (the status quo) and that the way the problem is framed can change decision-makers' perceived

reference points. Moreover, the response to losses is more extreme than the response to gains.

Prospect theory has been used to explain the escalation of commitment tendency (Bazerman, 1984; White, 1986). Decision-makers who receive negative feedback on an earlier decision are at a loss position, and will view the upcoming decision as a choice between the sure loss which has already occurred (i.e. choosing not to continue that course of action with additional investment) and a future loss that is less certain (i.e. risking additional funds in the hope of some positive return). Under this circumstance, decision-makers tend to be risk-seeking, choosing the uncertain loss which offers some hope for improvement (commitment of more funds) over the certain loss (the status quo). We predict that this uncertain loss and possible gain (the decision to risk additional funds by reinvesting), will be most attractive when it is framed as a potential gain, and relatively unattractive when framed as a potential loss.

Decision-makers who receive positive feedback, on the other hand, have a different reference point: they are faced with a choice between the sure gain (which has already occurred) and a gain in the future that is less certain. Under this circumstance, when the current balance is already positive, decision-makers tend to be risk-averse and less motivated to reinvest.

Thus, decision-makers with a negative current balance, searching for a future opportunity to recover their losses, are predicted to be particularly attracted to an opportunity framed as potential gain. An opportunity of equal expected value, but framed as a potential loss, is expected to be less attractive, leading to lower levels of reinvestment. This difference between framing conditions should be less pronounced for decision-makers whose reference point is a positive current balance (success feedback on the previous decision); these decision-makers generally are risk-averse and less likely to be attracted to uncertain future outcomes after already attaining certain gains, regardless of how those future uncertainties are framed.

Similar logic can be applied to predict an interaction between decision frame and perceived organizational slack. When decision-makers perceive slack to be low (a relative loss position)

they will be risk-seeking and particularly attracted to the positive-frame reinvestment opportunity. Decision-makers perceiving high slack (a certain, positive current balance), will generally be risk-averse and, regardless of how the uncertain future outcomes are framed, less likely to reinvest high levels of funds.

The following hypotheses are indicated:

Hypothesis 4: Decision frame will have a greater impact on reinvestment, with positive frame leading to the highest reinvestment levels, after failure feedback than after success feedback.

Hypothesis 5: Decision frame will have a greater impact on reinvestment, with a positive frame leading to the highest reinvestment levels, when perceived organizational slack is low than when perceived organizational slack is high.

Hypothesis 6: Decision frame will have a greater impact on reinvestment in a context of failure feedback and low perceived organizational slack than in a context of success feedback and high perceived slack.

To summarize, the psychological context of strategic decision-making is depicted in Figure 1. Past events, present conditions, and future outlook converge to affect the decision. In the initial experiment reported below, these three influences are operationalized via feedback on the outcome of a past decision, information regarding the organization's present resource state (perceived slack), and the frame of the upcoming decision. All three experimental variables are predicted to exhibit main effects on the dependent variable. Moreover, interactive effects are predicted to add to the predictive power of the additive main effects, in that decision frame will have a greater impact after negative feedback and/or low perceived slack conditions than after positive feedback and/or high perceived slack conditions.

STUDY 1

Design

A laboratory experiment was used to test the initial set of hypotheses. This methodology has

a long tradition in the decision sciences, and, more recently, it has been introduced in the study of major strategic decisions. For example, Schendel and Hofer (1979) and Schwenk (1982) vigorously advocate laboratory research in strategic management as a vital supplement to field research. Several recent contributions to the strategic decision process literature have resulted from laboratory research (Fredrickson, 1985; Schweiger, Sandberg and Ragan, 1986).

The experiment employed three independent variables, with two levels of each independent variable: (1) decision feedback (success or failure feedback for an initial decision); (2) perceived organizational slack (high or low perceived slack); and (3) decision frame (positive or negative frame). The resulting $2 \times 2 \times 2$ analysis of variance design created eight experimental cells. The dependent variable was the amount of money allocated by a decision team to a division that had received funding from this team in a prior decision. The level of acceptable risk regarding the second funding decision was also measured for both individual decision-makers and the strategic group. This was done primarily as a part of the decision frame manipulation, as described below.

Subjects

Subjects were 193 undergraduate students, 80 males and 113 females, enrolled in a junior-level management course at a major university. They received partial course credit for taking part in the experiment.

Groups of subjects were used to simulate the circumstances often associated with a major managerial decision. The groups were randomly assigned to the eight cells in the design. Six mixed-sex groups, ranging in size from three to five members with an average size of four, were assigned to each cell. Sex composition of groups in each cell ranged from 35 percent male to 48 percent male, with an average of 41 percent male. In total, 48 groups participated.

Procedure

Each group was cast in the role of the Executive Planning Committee for a large corporation. The group was presented with the Adams and Smith

Financial Decision Case, a written organizational scenario depicting the financial history (ten years of sales and earnings) of the two major divisions of the firm (from Staw, 1976). Sales and earnings of both divisions were trending downward in roughly equivalent magnitudes. According to the scenario, the Executive Planning Committee had an indivisible \$10 million in discretionary research and development funding (over and above the standard R&D allocations budgeted for each division), that must be invested in only one of the two divisions. Because this was a critical issue for the firm, the group was to decide which division should receive the funds. All group members participated and collaborated to write a paragraph supporting the group decision.

The experimenter then provided the group with success or failure feedback on the outcome of the initial decision, information about organizational slack, and a positive or negative frame describing the upcoming reinvestment decision. This information described the situation five years after the initial decision. Group members were advised to read and analyze the information independently.

Three decisions were then posed involving the subsequent investment of additional funds in the same division that had been selected by the group to receive the initial \$10 million. First, individual group members indicated independently the level of risk considered acceptable before reinvesting in the same division. Second, each group discussed and decided the level of risk acceptable to the group before reinvesting in the same division. For these decisions the available risk choices ranged from a 0 in 10 to a 10 in 10 probability of successful reinvestment, at increments of 1 in 10. Finally, each group received a memo from the board of directors indicating the odds of success for reinvestment, as determined by a team of reliable consultants. The probability of success indicated in this memo was equal to the probability already indicated by the Committee as their minimum acceptable level for reinvestment. The group was then asked to decide what portion of an available \$15 million should be reinvested in the division receiving the original investment. They were also informed that uninvested funds reverted to the firm's general pool. Each group discussed the decision, entered a dollar amount, and signed the group decision. Participants also completed a manipulation-check questionnaire.

Following the initial investment choice between divisions, and prior to the subsequent reinvestment decision, each group received one condition of each of the three independent variables.

Decision feedback

The success of the group's initial investment decision was conveyed in a memo from the Board of Directors. In the success condition, the memo stated: 'The decision has been a clear success . . . Congratulations!' It was accompanied by a table of sales earnings indicating that, in the ensuing years, the division that had been awarded the \$10 million demonstrated clear performance improvements in absolute terms and compared to the division that did not receive the initial funding.

In the failure condition, the memo stated: 'Unfortunately . . . your decision was a failure.' It was accompanied by a table of sales and earnings indicating that, in the ensuing five years, the division which had been awarded the \$10 million demonstrated clear performance declines in absolute terms and also compared to the division that did not receive the extra funding.

Perceived organizational slack

High or low perceived slack as an attribute of the firm's current resource position was conveyed in a memo from the Board. In the high-slack condition the memo stated that the courts had ruled in favor of the firm in a patent infringement lawsuit. The firm would receive damage payments from the offending company, substantially improving the firm's position. Consequently, \$15 million would be available to the Committee for the next decision.

In the low-slack condition the memo stated that the courts had ruled against the firm in a patent infringement lawsuit. The firm must pay damages, severely 'limiting' the firm's resources. Consequently, 'only' \$15 million would be available to the Committee for the next decision. It should be stressed that all groups had \$15 million available for reinvestment, but this amount appeared as an abundant \$15 million in the high-slack condition and as a meager \$15 million in the low-slack condition.

In the positive frame condition the acceptable risk measure for the subsequent reinvestment decision was operationalized in terms of a success orientation, with the poles labeled 'lowest chance of success' (0 in 10) and 'highest chance of success' (10 in 10). Additionally, the organization's goal orientation was conveyed in a memo from the Board of Directors stating that 'a major goal of the Planning Committee is to maximize total profits over time'. The reinvestment decision should be made with the goal of 'high future gains'.

In the negative frame condition the acceptable risk measure was phrased in terms of chances of failure rather than chances of success. The memo from the Board stated that 'a major objective of the Planning Committee is to minimize total losses over time'. The reinvestment decision should be made with the goal of limiting 'financial loss' and 'waste'. This manipulation was very similar to the manipulation employed by Neale and Bazerman (1985).

RESULTS

Manipulation checks

All three manipulation measures were shown to have acceptable levels of internal reliability. They further showed that each of the experimental manipulations had its intended effect on individual group members. Each effect also was unaffected by the other two (nonpertinent) manipulations, as tested through analysis of variance using the manipulation measures as dependent variables.

The success/failure manipulation measure had a coefficient alpha of $\alpha = 0.89$, and the difference between the two experimental conditions was significant at $F_{(1,191)} = 432.63, p < 0.0001$. The perceived slack manipulation measure had an internal reliability of $\alpha = 0.76$, and showed a significant difference between slack conditions at $F_{(1,191)} = 221.70, p < 0.0001$. Finally, the frame measure had a coefficient alpha of $\alpha = 0.68$, and revealed a difference between positive and negative framing conditions at $F_{(1,191)} = 86.65, p < 0.0001$.

Reinvestment decision

The dependent variable of interest was the subsequent group decision regarding the number

of dollars to reinvest in the same division. Analysis of variance, summarized in Table 1, revealed that all three experimental manipulations had main effects on the group investment decision, providing support for Hypotheses 1, 2, and 3. Groups invested more money after an initial failure than after an initial success ($\bar{x}=\$10.3\text{m}$ vs. $\$8.9\text{m}$; $F_{(1,40)} = 4.56, p=0.039$). Identically, groups also reinvested more funds under low slack conditions than under high slack conditions ($\bar{x}=\$10.3\text{m}$ vs. $\$8.9\text{m}$; $F_{(1,40)} = 4.56, p=0.039$). Finally, a positive frame led to a higher level of reinvestment than negative frame ($\bar{x}=\$10.4\text{m}$ vs. $\$8.7\text{m}$; $F_{(1,40)} = 6.29, p=0.016$).

Table 1. ANOVA results

Source of variation	d.f.	MS	F
(A) Decision feedback	1	2479.687	4.563*
(B) Perceived slack	1	2479.687	4.563*
(C) Decision frame	1	3417.187	6.288*
A × B	1	1150.521	2.117
A × C	1	3088.021	5.682*
B × C	1	2479.687	4.563*
A × B × C	1	2200.521	4.049*
Error	40	543.436	
Total	47	830.484	

* = $p \leq 0.05$.

Consistent with Hypotheses 4 and 5, two of the three two-way interactions also were significant. These interactions override the main effects in importance. The interaction between feedback and the framing of the subsequent decision was significant ($F_{(1,40)} = 5.68, p=0.022$). The highest level of funding was committed when an initial failure was followed by a positive frame for the reinvestment decision ($\bar{x}=\$12.0\text{m}$). Lower levels of funding occurred if initial failure was followed by a negative frame ($\bar{x}=8.7\text{m}$), or when the initial decision was a success, regardless of whether the framing of the subsequent decisions was positive ($\bar{x}=\$8.9\text{m}$) or negative ($\bar{x}=\8.8m).

A similar pattern of interaction was found between perceived organizational slack and framing of the reinvestment decision ($F_{(1,40)} = 4.56, p = 0.039$). A positive frame in a context of low perceived slack resulted in the highest commitment of funds ($\bar{x}=\$11.9\text{m}$). A negative frame in the same low slack context led to lower levels of reinvestment ($\bar{x}=\$8.8\text{m}$). Lower levels

of funding also occurred in a context of high perceived slack, regardless of whether the decision had a negative ($\bar{x}=\$8.8\text{m}$) or positive ($\bar{x}=\9.0m) frame.

Finally, Hypothesis 6 was supported by a significant three-way interaction ($F_{(1,40)} = 4.05, p = 0.051$). The aforementioned main effects of the decision feedback and slack manipulations are clearly in evidence when the subsequent decision was phrased in positive terms; however, a different pattern is observed when the frame was negative. When the initial decision was a failure and low perceived slack existed, a negative frame led to low investment levels ($\bar{x}=\$7.5\text{m}$). This result contrasts with the result for the same decision context (past failure, low perceived slack) when followed by a positive frame, where the highest investment levels ($\bar{x}=\$13.6\text{m}$) were found.

In sum, the hypotheses of this study were supported. Six of the seven F tests were significant: all three manipulations had main effects on the group reinvestment decision, two had separate, yet virtually identical, interactions with the framing variable, and the three variables had a joint impact in a three-way interaction effect.

STUDY 2

A second, related experiment was designed and conducted to assess the generalizability of the effects identified in the first experiment. The reader should note several important differences between the two studies. Because of the potential limitations involved with the use of a student sample, Study 2 used a practitioner sample to increase the degree of confidence placed in the initial results. Moreover, this second study investigated individual rather than group decision-making to broaden further the contribution of this research.

Study 2 also differed from the first study in that it used only two experimental manipulations. Decision feedback and perceived slack were merged into one variable, exposing subjects to either failure feedback and low perceived slack or to success feedback and high perceived slack. Two considerations justified this. First, these two manipulations operated in the first study in an analogous manner, with similar interactions with

METHOD

decision frame as well as main effects. Second, they seem to share an underlying conceptual similarity. The constructs may coexist along a single continuum ranging from a negative to a positive perceived context for the upcoming decision. Failure feedback and low perceived slack may create for the decision-maker a negative decision context, whereas success feedback and high perceived slack create a positive decision context. Thus, it was reasonable to covary these two manipulations for Study 2. While a replication of the three-way design of the first study using groups of executives may have been a useful intermediate step in the research process, sample size limitations precluded such an approach. Nevertheless, the generalizability of the major findings still could be addressed by testing for consequent validity using different samples and experimental manipulations.

Hypotheses

Based on the rationale and results of the initial experiment, three hypotheses were tested. The primary hypothesis was derived from the interaction effects of the independent variables on the reinvestment criterion:

Hypothesis 1: Decision frame will have a greater impact on reinvestment in a context of failure feedback and low perceived slack than in a context of success feedback and high perceived slack.

Hypothesis 1 was the most important specific prediction because interaction effects typically are more important than main effects.

The other two hypotheses were therefore considered to be of secondary importance. They were formulated and tested explicitly, however, to ascertain the extent to which the Study 1 results would generalize to the second experiment. Thus, two replication hypotheses were developed regarding the potential main effects:

Hypothesis 2: A positive decision frame will result in higher levels of reinvestment than a negative decision frame.

Hypothesis 3: Failure feedback and low perceived slack will result in higher levels of reinvestment than success feedback and high perceived slack.

Design

With the exceptions noted above, the design of this experiment was very similar to the first. The experiment employed two independent variables, with two levels of each independent variable: (1) failure feedback/low perceived slack vs. success feedback/high perceived slack, and (2) negative vs. positive decision frame. The resulting 2×2 analysis of variance design created four experimental cells. The dependent variable was the amount of money reinvested by a decision-maker in a division that received funding from the subject during a prior decision.

Subjects

Subjects were 48 business executives from the community surrounding the host university. All subjects had major decision-making responsibilities within their organizations. They volunteered in response to a letter mailed by the researchers through the local Chamber of Commerce, requesting that they visit the campus to participate in a decision-making simulation.

Initially, 72 of the 200 managers contacted expressed a willingness to cooperate. Of those 72, the first 48 who were available at scheduled times comprised the final sample. Approximately 93 percent were male, and the average age was 43.6 years, with a range from 31 to 71 years. Subjects were randomly assigned to the four experimental cells, within the constraint of equal cell sizes ($n=12$).

Procedure

Each subject was cast as a senior executive with major decision-making responsibility. Individual subjects were given the Adams and Smith Financial Decision Case. Interest, involvement, and perceived relevance were generally very high, as indicated by the long periods of time spent on the decisions and the lengthy discussions and frequent positive comments during debriefing sessions.

Each subject wrote a paragraph supporting his or her initial choice of divisions to receive funding. The experimenter then provided the information that placed each subject into one of the four experimental cells. This information described the situation five years after the initial

Table 2. ANOVA results

	Source of variation	d.f.	MS	F
(A)	Decision feedback/ slack	1	21.333	1.939
(B)	Decision frame	1	140.083	12.730**
	A × B	1	52.083	4.733*
	Error	44	11.004	
	Total	47	14.844	

* = $p \leq 0.05$; ** = $p \leq 0.001$.

decision. Half of the subjects received success feedback on the initial decision and the memo indicating high organizational slack. The other half of the subjects received failure feedback on the initial decision and the memo indicating low organizational slack. Within each of these conditions, half of the subjects received the positive frame for the upcoming reinvestment decision, and the other half received the negative frame.

Two decisions were then posed. First, subjects determined the level of risk they would consider acceptable before reinvesting in the same division. Each subject then received the memo from the Board of Directors indicating that, according to the conclusions of reliable consultants, the subject's acceptable odds of success for reinvestment had been achieved. Second, the subject was asked to decide what portion of an available \$15 million should be reinvested in the division receiving the original investment. Subjects were also informed that uninvested funds reverted to the firm's general pool to be used for other projects. Each subject decided on a dollar amount, signed the decision, and then completed a manipulation-check questionnaire.

RESULTS

Once again, the dependent variable was the number of dollars reinvested in the same division. Two-way analysis of variance, summarized in Table 2, revealed two significant effects.

One of the two possible main effects was significant. Hypothesis 3 was not supported. Although the reinvestment levels were in the hypothesized direction, the difference between success/high slack ($\bar{x} = \$6.75\text{m}$) and failure/low slack ($\bar{x} = \$8.08\text{m}$) did not achieve an acceptable level of statistical significance ($F_{(1,44)} = 1.94$, $p = 0.171$). Consistent with Hypothesis 2, however, subjects on average reinvested more funds when the subsequent decision was framed positively ($\bar{x} = \$9.13\text{m}$), as opposed to negatively ($\bar{x} = \$5.71\text{m}$; $F_{(1,44)} = 12.73$, $p = 0.001$).

Hypothesis 1 was supported by a significant two-way interaction effect ($F_{(1,44)} = 4.73$, $p = 0.035$). As predicted, decision frame had a greater impact on the reinvestment decision after failure/low perceived slack than after success/high perceived slack. The highest level of reinvestment was found when a failure/low slack context was

followed by a positive frame ($\bar{x} = \$10.83\text{m}$). Lower levels of reinvestment were found when failure/low slack was followed by a negative frame ($\bar{x} = \$5.33\text{m}$), or when subjects experienced success and high perceived slack, regardless of whether the decision frame was positive ($\bar{x} = \$7.42\text{m}$) or negative ($\bar{x} = \6.08m).

DISCUSSION

The results of Study 1 provided support for the six initial research hypotheses and the model of psychological influences on strategic decision-making (Figure 1). The effects indicated the potential importance of past, present, and future considerations. Most importantly, the interactions between decision frame and the other independent variables showed strikingly similar patterns across both studies. A positive frame coupled with either an initial failure, low perceived slack, or a combination of both (represented by the three-way interaction in Study 1 and the two-way interaction of Study 2) resulted in significantly higher levels of reinvestment than in any of the other contexts. The positive frame, therefore, appeared to activate or exaggerate the potential effects of failure feedback and low slack, leading decision-makers in these negative contexts to reinvest larger amounts. Viewed another way, the negative frame reduced the escalation of commitment of additional funds that might otherwise occur in the negative contexts.

These interactions converge on the same implication. Decision-makers appear to be more influenced by incoming information (in the form of decision frame) in a negative current context, rather than a positive context. Staw and Ross (1978) found a similar interaction indicating a greater attention to incoming information after a failure than after a success. The present

experiments generalize their finding to situations in which: (1) the incoming informational cues were created by the framing of a subsequent decision; (2) the negative decision context was characterized by low perceived slack, as well as by failure on a previous decision; (3) groups, as well as individuals, made the decisions; and (4) practicing managers, as well as students, were the subjects.

The interaction effects suggest an interesting and important paradox. Increased sensitivity to incoming information is potentially beneficial to decision-makers who are faced with the need to recover from a failure, or who find themselves in some other type of negative decision context. However, in the studies reported here, the incoming information evoked potentially detrimental biases caused by framing. When the profit vs. loss phrasings and goal statements exerted their subjective influences, attention was drawn away from the 'facts' (future probabilities) provided by the outside consultants.

Thus, the existence of differing sensitivities to incoming information has both potential advantages and disadvantages. The impact of this interaction between current context and incoming information will depend on the nature of the current context, as well as the cognitive decision processes that are evoked. Presumably, the impact will be beneficial when: (1) sensitivity to information is *heightened* because of an adverse situation; (2) attention is given to *appropriate* information, such as causal analyses of current problems and valid assessments of future prospects; and (3) information is *used appropriately*, in an unbiased way. Conversely, the effects may be detrimental when: (1) sensitivity to important information is *reduced* because of a positive current context; (2) increased sensitivity in a negative context results in attention to *inappropriate* information, such as irrelevant data, inaccurate causal attributions, and projections based on invalid assumptions; and (3) potentially helpful information is *used inappropriately* due to distortions caused by framing or other cognitive biases. Both situational and process contingencies, therefore, will dictate the utility or disutility of this interactive effect.

As a whole, the findings indicate the critical influence of decision frame on the strategic decision process. These findings reinforce the arguments and research of Kahneman and Tver-

sky (1984), Dutton and Jackson (1987), Dutton *et al.* (1983), Fredrickson (1985), and Whyte (1986). Although decision feedback, perceived slack, and other aspects of the decision context may provide the background conditions for important managerial decisions, the language and labels employed during the decision process may influence the way in which decision-makers respond to these conditions.

The impact of decision frame is important for two reasons. First, the results show biases that decision-makers may have. The same objective future prospects, viewed from different orientations or 'mind sets', will lead to different, biased decisions. Second, the findings have clear implications for communication and persuasion in decision situations. The use of different phrasing (i.e. potential profit vs. potential loss, probabilities of success vs. failure) may persuade people in different directions even though the 'numbers' are equal. Framing, therefore, may be used to influence other organizational members, potential investors, and other stakeholders.

As with all initial research findings, some caution must be exercised in assessing their relevance for strategic decision-making. Despite the value associated with the experimental design, the results may not generalize to all strategic decision situations. The case used in the experiment could not capture the complexity inherent in many strategic decisions, and the experiment certainly involved less time than is allotted to most strategic decisions. The results may have their greatest application to major resource allocation decisions, or decisions that lend themselves to different frames. Clearly, additional research should explore the generalizability of the results with respect to various types of strategic decisions.

Furthermore, the similar results found with both students and executives probably does not extend to all strategic research issues. For example, Fredrickson (1985) found that MBA students and executives differed in the processes that they recommended for making the same strategic decisions. He suggested that this difference may have been due to the recent training of the MBA student subjects, training that emphasized sensitivity to cues in case analysis. In the present study, however, the focus of the research was on the actual design outcomes rather than the processes used to reach a decision.

The students had not been trained extensively in case analysis, yielding a set of student and executive subjects that were similarly 'naive'. In sum, the present study may be capturing underlying cognitive biases in response to different psychological decision contexts, rather than different process orientations due to training.

CONCLUSIONS AND DIRECTIONS FOR FUTURE RESEARCH

The research summarized in this paper was intended to investigate the potential contribution to the study of strategic decision-making of a model of the psychological context of decisions. Constructs representing three streams of decision research were employed to create the psychological context for decision-makers. The results of the research suggest that these influences, operating through the specific experimental variables, may have a simultaneous and significant impact on strategic decisions. In particular, the future outlook of the decision-maker, as influenced by the decision frame manipulation, may exert a powerful psychological influence. However, the nature of this influence may depend on past events and the current conditions facing the decision-maker.

The identical main effects for decision feedback and slack in Study 1 and their consistent interactions with decision frame (separately or in combination) suggest an interesting issue for future theory and research. Although the decision feedback and slack manipulations are different constructs, they operated in an analogous manner. This suggests the possibility of some underlying conceptual similarity. As noted earlier, the constructs may coexist along a single continuum ranging from a positive to a negative perceived current context for the decision-maker. Perhaps a viable conceptual model to capture these effects is a general 2×2 framework including perceptual dimensions of (1) positive vs. negative current context (as influenced by feedback, slack, etc.), and (2) positive vs. negative future outlook (as influenced by gain/loss framing of decision alternatives and other information affecting perceptions of future prospects).

The first dimension, perceived current context, is defined by the prevailing conditions within which the decision-maker and the organization

are operating. It includes information pertaining to past and present decision factors. In the research reported above, current context integrated feedback on a previous decision with an exogenous event influencing perceived organizational slack. Future theory and research may build into this dimension other pertinent decision factors such as patterns of organizational growth and decline, financial strength, industry and market conditions, prior success rates for other ventures, accumulated prestige or pressures relevant to the decision-maker(s), and recent performance appraisals of decision-makers.

The second dimension, future outlook, emphasizes perceptions of the future relevant to the decision being faced. In the present research this dimension was operationalized through the framing of the reinvestment decision. Similar variables pertinent to future theory and research may include information concerning the future probabilities of success in specific ventures, information about alternative courses of action, individual differences in the personal outlook of decision-makers, and perceptions of threat vs. opportunity in the environment.

The framework also could be extended and tested in several additional ways. First, it could be applied in tests of individual, group, and organizational levels of decision-making, including processes such as individual cognitive biases and heuristics (Nisbett and Ross, 1981), groupthink (Janis, 1972), and other aspects of strategy formulation and implementation (Schendel and Hofer, 1979). Second, the framework also may help to extend and to integrate current theoretical and empirical work from other decision theory literatures. As suggested by this research, an integrated approach may be helpful, particularly in understanding strategic decision processes. For example, the framework may be applied to the study of decisions related to the risk/return paradox (Bowman, 1980) and the Miles and Snow (1978) strategic typology.

In these extensions a key area for future work concerns the relative influence of events. Under what circumstances will past, present, and future considerations exert their strongest (weakest) effects? Raynor (1982) suggests that these effects are a function of the individual's stage of striving along a sequence of tasks. In early striving, future considerations are most important; in late striving, the retrospective past is more important. In

middle, striving, the retrospective past, evaluated present, and anticipated future all can influence motivated decisions.

At a more macro level of analysis, anthropologists differentiate cultures along different value-orientation dimensions. One of these dimensions is temporal, a past vs. present vs. future orientation (Kluckhohn, 1953). Such diversity in these orientations may exist also among modern organizations. Some organizations seem to live for the past and make conservative decisions (perhaps based on what the founder might have wanted), whereas other organizations exhibit decision-making cultures characterized by a break from the past and a forward-looking orientation. Future research may be directed at exploring the relationship between these temporal decision orientations and the strategic posture of the firm. For example, a strong past or present orientation may lead to a Defender-type strategy, whereas a strong future orientation may be associated with a Prospector-type strategy (Miles and Snow, 1978).

This research should increase the general awareness of practitioners with respect to the impact of cognitive biases on strategic decisions. In particular, the escalation phenomenon, leading to increased commitments to a losing course of action, may have disastrous implications for an organization at the strategic level. Executives at all levels must pay close attention to perceptions of success, failure, and slack, and the decision tendencies resulting from these perceptions. Furthermore, this research suggests the overall importance of decision frame and the potential impact that it may have on decision-makers faced with a negative situation. Executives may find that decision frame can be used to influence the outcomes of a strategic decision process, but they also must be sensitive to the effects of frame on themselves.

Future research on the specific issues examined in these studies, and the extensions discussed above, should involve field as well as laboratory designs. For example, a longitudinal study could focus on a sample of organizations operating in similar environmental and strategic contexts, yet with different performance outcomes. Changes in strategies and financial commitments could be investigated to determine the effects of previous success or failure and different perceptions of slack. Ideally, the researchers may have access

to company documents or may be able to observe the decision process itself to detect variations in the ways that the decisions are framed. Obviously, such clinical, process-oriented research would involve major commitments in terms of research resources and access.

Ultimately, research should determine how decision-makers can most appropriately and effectively use the retrospected past, evaluated present, and anticipated future as valid inputs into the decision process. For government policy makers, Neustadt and May (1986) advise developing the habit of seeing time as a stream, viewing issues in the present with a sense of historical currents as well as an eye to the future. For strategic managers in business, as well, their psychological context and decision-making effectiveness may be influenced by different events, perceptions, and orientations regarding the past, present, and future.

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