

## Opportunity Costs and the Framing of Resource Allocation Decisions

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This paper develops and tests an information-processing explanation of the behavior of decision makers when resource allocation decisions meet with setbacks. Findings support the contention that because opportunity costs often are ignored, setback decisions may be framed as choices between certain losses and the possibility of larger or no losses. Making opportunity costs more explicit alters the framing of such decisions and leads to decisions which more closely mirror traditional cost/benefit prescriptions. © 1986 Academic Press, Inc.

A considerable amount of recent research (e.g., Fox & Staw, 1979; Lewicki, 1980; Rubin & Brockner, 1975; Staw, 1981) has examined the behavior of decision makers when long-term resource allocation decisions meet with setbacks such as decreased revenues or increased costs, resulting in unanticipated and unfavorable long-term outcomes. If the original decision is not reversible and entails further expenditures of time, effort, or money, the decision maker must decide whether to abandon the previously chosen course of action or to continue on in the face of probable (and often potentially increasing) losses. This paper considers and tests an information-processing approach to understanding the behavior of decision makers in such situations.

An example of this decision dilemma is provided by the experiences of the city of Chicago in building a new super sewer system (see "Money down the drain," 1979). The further the project progresses, the greater the projected final cost of the project and the less likely it appears that the project will be completed. Closer to home, one might imagine the builder of a large apartment complex who sees the bottom drop out of the rental housing market during the early phases of construction. In all such cases, the issue that arises is whether to continue and finish the project—arguably to "throw good money after bad"—or to minimize losses by discontinuing the project and getting out before further irretrievable costs are incurred.

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The decision to continue or abandon a project should be based upon return on future expenditures (Horngren, 1982). In projects where there are large setup or up-front costs, small "finishing" expenditures often yield large returns near the conclusion of the project, even if the returns do not recoup all the original up-front costs (Northcraft & Wolf, 1984).

Research suggests, however, that decision makers all too often persist, or even escalate resources committed to a course of action, even when persistence or escalation clearly is not justified by future return calculations (Fox & Staw, 1979; Staw, 1976, 1981). It is the apparent irrationality of this behavior which has aroused the curiosity of researchers. Two psychological explanations have been volunteered in the literature to explain this pattern of resource allocation behavior.

The first explanation focuses on the motivations of the decision maker and the psychological mechanism of commitment. Commitment is believed to derive from an individual's adopting a stance of belief in the goodness of a course of action—a stance which may be subject to self-justification (Wicklund & Brehm, 1976), justification to others (Gaes, Kalle, & Tedeschi, 1978), and norms of consistency (Sidey, 1978) when that course of action later results in unfavorable outcomes. This explanation of economically irrational persistence highlights the fact that decisions never occur in a social vacuum. The social context in which a decision occurs provides an additional layer of costs and benefits to be considered. While continuing or abandoning a project entails certain budgetary costs and benefits, there also are costs and benefits for the decision maker in terms of self-image, organizational image, reputation, face-saving, etc. Persistence in a course of action, then, may result if the social or psychological benefits of continuing outweigh the monetary costs.

The second psychological explanation for resource allocation persistence or escalation in the face of a major setback trades in the psychology of information processing. Behavioral decision theory research (e.g., Einhorn & Hogarth, 1981; Tversky & Kahneman, 1974) has brought to light several aspects of human information processing which lead decision makers to systematic departures from the "rational" prescriptions of economic models. One aspect of human information processing—decision *framing*—is particularly relevant to resource allocation decisions.

The notion of framing comes from prospect theory (Kahneman & Tversky, 1979). Prospect theory states that decision makers will be risk-averse when choosing between certain gains and the risk of larger or no gains, but will be risk-seeking when choosing between certain losses and the risk of larger or no losses. (For a more detailed discussion of framing, see Tversky & Kahneman, 1981). Arkes and Blumer (1985) have suggested that these inconsistencies in risk preference reflect an aversion for

waste (for instance, taking a certain loss) and an even greater aversion for being responsible for waste (for instance, by having chosen a wasteful course of action). Most importantly, this line of research suggests that the way a decision is worded or presented (i.e., whether outcomes are "framed" in terms of losses or gains) will influence the evaluation of the prospects of each alternative, and thereby affect choice behavior.

Abandoning a course of action before its conclusion or completion seems inevitably wasteful of time, if not of money. Some proportion of start-up or initial-phase costs that have been incurred certainly will be lost. On the other hand, persistence or escalation holds the possibility of salvation from (or at least postponement of) wastefulness. Thus, the choice faced by a decision maker when a project encounters a major setback may look like this:

Abandoning project	vs	Persisting in project
Certain loss of start-up or initial-phase costs		High probability of larger loss and small probability of no loss or small gain

Prospect theory and framing, then, would account for persistence when a major setback is encountered. Abandoning the project presents the prospect of a certain, immediate, and irretrievable loss—a course of action which is to be avoided.

The choice stated above is, however, misleading. Though persistence presents an opportunity to salvage past costs, another kind of loss—opportunity costs—accrues in the meantime. If additional time, money, or even psychic energy must be invested to persist in a course of action, then the foregone opportunity to invest those resources elsewhere becomes a *certain and wasteful* loss. The choice faced by the decision maker when a project incurs a major setback therefore should look like this:

Abandoning project	vs	Persisting in project
Certain loss of start-up or initial phase costs and possible gain from diversion of remaining resources		High probability of larger loss and small probability of no loss and certain loss of return from diversion of remaining resources

The choice of the "setback scenario," then, should be between alternative courses of action which *both* include certain loss and possible gain components. This suggests that aversion to certain loss should not play a role in these decisions.

However, opportunity costs may not have the salience of out-of-pocket

costs because opportunity costs are passively rather than actively expended. Opportunity costs are abstract possibilities "expended" by the passage of time. Consequently, opportunity costs are less likely to be considered in a decision maker's deliberations (Becker, Ronen, & Sorter, 1974; Hoskin, 1983). Thus, economically inadvisable persistence in a course of action in the face of a major setback may result from a biased assessment of the cost/benefit picture. The difference in salience between opportunity costs and out-of-pocket costs results in project-continuance decisions being incorrectly framed as a choice between certain losses and the possibility of no losses. More generally, the differences between opportunity and out-of-pocket costs should make the option of finishing a project in the face of a major setback appear more positive (and the option of abandoning the project more negative) than warranted by traditional cost/benefit analysis.

The following study assessed the plausibility of this information-processing explanation for persistence in a course of action in the face of a major setback. Business school students read two short cases and made resource-allocation decisions based upon the facts provided in the cases. The cases each presented a partially completed project that had met with a major financial setback. It was hypothesized that (1) opportunity costs will be less likely than out-of-pocket costs to be considered in deciding whether to abandon or continue a project, (2) heightening the salience of opportunity costs will render persistence more negative an option and abandonment more positive an option, and (3) heightening the salience of opportunity costs will decrease persistence in the face of a major setback.

## METHOD

### *Subjects*

Twenty undergraduate business school students at the University of Arizona participated as subjects. All participants were enrolled in an organizational behavior course; participation in the study was voluntary and was used as the basis for later class discussions concerning managerial decision behavior. Subjects were randomly assigned to experimental conditions.

### *Procedures*

Subjects read two short cases and made resource allocation decisions based on the facts of the cases. The cases concerned Sunburst Investments, a fictional real estate development firm. To ensure realism of the case materials, a local construction company executive assisted in the development of details of the cases. The firm described in the cases was based in Tucson, Arizona, where it was noted that "in an expanding in-

TABLE 1  
CASE DETAILS

	Project	
	Tennis club	Office park
2-year budget	\$6.73 million	\$10.68 million
Estimated selling price	\$7.75 to \$9.64 million	\$12.3 to \$15.3 million
Effective 2-year	14 to 19%	14 to 19%
Spent after 1 year	\$1.97 million	\$3.132 million
Needed to finish	\$6.32 million	\$10.03 million
Revised 2-year budget	\$8.29 million	\$13.158 million
Offered for unfinished project	\$1.76 million	\$2.8 million
Effective 2nd-year rate of return	7.5%	7.5%

dustrial center like Tucson, there are always construction projects available, usually returning anywhere from 15% to 25%." It was also stated in the cases that interest rates were currently running between 10 and 15%. These two pieces of information provided the *implicit* opportunity cost information.

Subjects assumed the role of investment advisor at Sunburst, a job which involved "monitoring and directing the allocation of funds throughout the course of projects." In the cases, Sunburst Investments last year had undertaken construction of either an office building complex or a tennis club. Problems had increased costs for the projects and necessitated consideration by the investment advisor of whether to continue or abandon the projects.

There were two versions of each case: implicit opportunity costs (IOC) and explicit opportunity costs (EOC). In the IOC versions of each case, it was explained that the project had been started with a projected 2-year budget and selling price as shown in Table 1. With some of the original budget already spent, it was now apparent that the project was going to be over budget, while the projected selling price had not changed. Meanwhile, another company had made an offer for the partially completed project which would occasion some loss of money already sunk into the project.

After reading through each case, subjects were asked to complete a one-page questionnaire. The questionnaire asked each subject to (1) rate the options of finishing and not finishing the project on a 7-point scale (1 = *very negative*, 7 = *very positive*), (2) make a recommendation to finish or not finish the project, (3) rate how sure of his/her decision the subject was on a 7-point scale (1 = *certain we should finish*, 7 = *certain*

*we should sell*), and (4) describe the two options between which the subject had chosen.

The EOC versions of the cases differed from the IOC versions in two ways. First, at the end of the text of the case, a paragraph was added which detailed the possible return that could be gained by diverting the funds needed to finish the project either into an investment savings account (at 11%) or another project (18%). Both of these alternatives were conservative given the earlier details of the cases. Second, the first dependent measure for subjects in this condition asked the subject to describe two things she/he could alternatively do with the funds needed to finish the project if she/he decided to sell the partially completed office complex or tennis club.

Thus, the salience of opportunity costs was increased in the EOC condition on three dimensions. Subjects were given a *specific* opportunity cost to consider rather than an abstract range, and subjects were asked to *actively generate concrete* alternative uses for the additional funds.

## RESULTS

There were no significant effects for presentation order or case type ( $p$ 's > .20) for any of the dependent measures. Therefore, data were combined across presentation order and case type for all analyses.

Hypothesis 1 was confirmed. The last question of each case asked the subject to describe the two options from which she/he had chosen. When describing the two decisions, 100% of subjects mentioned out-of-pocket costs in both the IOC and EOC conditions. However, opportunity costs were mentioned by 15% of subjects in the IOC conditions but 85% of subjects in the EOC conditions. Apparently, encouraging active processing of specific, concrete opportunity cost information increases the probability that opportunity costs will be considered in project-continuation decisions. Out-of-pocket costs always are considered.

Hypothesis 2 was confirmed. Since all subjects completed cases in both the IOC and EOC conditions, the impact of opportunity cost salience on perceived value of finishing and not finishing the projects could be examined using the difference in ratings of the two options (finishing and not finishing) in the two conditions. When opportunity costs were explicit, subjects rated the option of finishing the partially completed project as significantly more negative ( $\bar{X}_D = 2.05$ ,  $t(19) = 4.96$ ,  $p < .001$ ) and rated the option of not finishing the project as significantly more positive ( $\bar{X}_D = 2.05$ ,  $t(19) = 5.12$ ,  $p < .001$ ) than when opportunity costs were not explicit.

Hypothesis 3 was tested in two ways. First, subjects' decisions in the EOC and IOC conditions were compared. Twelve subjects (60% of the sample) decided to sell the partially completed project in one condition

and finish the project in the other condition. Of these subjects, all 12 chose to sell the partially completed project in the EOC condition and finish the project in the IOC condition. The probability of all 12 "switching" subjects following this predicted pattern by chance is less than .001. Hypothesis 3 also was tested by examining the differences between conditions of subjects' certainty about selling or finishing the partially completed project. Subjects were significantly more certain they should sell the partially completed project in the EOC condition ( $\bar{X}_D = 1.5$ ,  $t(19) = 5.20$ ,  $p < .001$ ) than in the IOC conditions. These two findings both confirm Hypothesis 3.

### DISCUSSION

The results of this study support the contention that information-processing differences in the salience of out-of-pocket and opportunity costs may account for persistence in a venture when a major setback is incurred. Differences in the salience of out-of-pocket and opportunity costs apparently lead decision makers to a limited conceptualization of a resource allocation decision in the face of a setback. Specifically, the decision maker's choice appears to be between a certain loss and a small probability of no loss. Framing the decision in this way encourages persistence to avoid a certain loss—even when persistence clearly is inadvisable from a traditional cost/benefit perspective. Increasing the salience of the opportunity costs of persistence highlights the "certain loss" component of persistence, thereby alleviating decision bias arising from aversion to certain loss.

As noted by Hoskin (1983), opportunity costs generally are considered legitimate and important considerations in resource allocation decisions. Thus, decision procedures or aids which encourage or remind decision makers to consider opportunity costs in an explicit manner and in concrete terms should produce higher quality decisions. This suggests that higher quality resource allocation decisions would be expected if decision protocols (for instance) prohibited "go/no go" choices on projects in favor of choices among concrete alternatives for allocation of resources. This should prove a fruitful arena for future research.

One might have expected that increasing the salience of opportunity costs in the first case would result in greater attention being paid to opportunity costs in the subsequent case. That a presentation order effect was not found may be a function of the low statistical power of a small-sample study. On the other hand, this could also reflect the illusion of completeness decision information sets can have even in the absence of important considerations (Fischhoff, Slovic, & Lichtenstein, 1978). Changes in decision behavior occasioned by heightening the salience of opportunity costs may reflect a demand characteristic—the very kind of

demand for consideration that a decision aid would be designed to produce. Consequently, it will be important for future research to explore whether consideration of opportunity costs when made explicit is simply a demand characteristic reaction or, instead, reflects an understanding of the importance of opportunity costs in resource allocation deliberations.

As a final thought, it is worth considering the difference between amateurs and experts with respect to the probability of opportunity costs being considered. If an expert is someone who makes a particular type of decision repeatedly (for instance, an investment portfolio manager), we might expect that either (a) those rare individuals who are naturally more likely to consider opportunity costs should have a competitive advantage and therefore be overrepresented (by natural selection) in a sample of experts, or (b) learning should occur from training or repeated exposure to decision settings in which opportunity costs should be an important consideration in high-quality decisions. In either case, expert decision makers should not show the same insensitivity to opportunity cost considerations demonstrated by the subjects in this study. These issues, too, await further research.

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