

When success breeds failure: The role of self-efficacy in escalating commitment to a losing course of action

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Summary

The search for individual differences relevant to behavior in escalation situations has met with little success. Continuing the search, this study investigated self-efficacy judgments as a potentially important individual difference in escalating commitment to a losing course of action. Predictions derived from self-efficacy theory suggest that self-percepts of high efficacy would exacerbate the economically irrational escalation bias whereas self-percepts of low efficacy would diminish it. These predictions were consistently supported in this laboratory study where business students responded to decision dilemmas in which funds had been committed to a failing course of action. Theoretical and practical implications of these findings are drawn for the escalation and self-efficacy literatures. © 1997 John Wiley & Sons, Ltd.

J. Organiz. Behav. 18: 415-432 (1997)

No. of Figures: 0 No. of Tables: 7 No. of References: 72

Introduction

Frequently, we initiate courses of action that over time appear to have been undertaken in error. Is it best to stay the course and press on regardless of the obstacles, or does it make more sense to withdraw from the failing course of action, learn from one's mistakes, and pursue other opportunities? In these circumstances, there is a well-documented bias towards persistence, although such action may only make matters worse.

This phenomenon has been referred to as 'knee deep in the big muddy' (Staw, 1976), entrapment (Brockner and Rubin, 1985), the sunk cost effect (Arkes and Blumer, 1985; Thaler, 1980), and 'too much invested to quit' (Teger, 1980). These names reflect the many situations in which escalating commitment to a losing course of action occurs, such as interpersonal relations (e.g. Rusbult, 1980), waiting situations (e.g. Rubin, 1981), gambling (e.g. McGlothlin, 1956),

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The authors are grateful to Martin Evans for comments and suggestions on previous drafts, and to Lee Brown, Clement Hannah and Peter Mudrack for their assistance in conducting this study.

economic investment (e.g. Thaler, 1980), policy making (e.g. Janis, 1982), and organizational resource allocation (e.g. Staw, 1976).

Many causal mechanisms have been invoked to explain this behavior (for reviews, see Brockner and Rubin (1985) and Staw and Ross (1987a)), and evidence suggests the validity of several of these approaches. Relatively little is known, however, about the relationship between individual differences and the tendency to escalate commitment to a losing course of action. This is unfortunate because individuals appear to differ significantly in terms of their susceptibility to escalation (Knight and Nadel, 1986).

These differences may derive substantially from the beliefs people hold about their ability to cope with aversive and uncertain circumstances. According to self-efficacy theory (Bandura, 1973, 1977), people's judgments of self-efficacy in part determine what activities to undertake, how many resources to expend in the effort, and how long to persist in the face of obstacles or difficulties (Bandura, 1982, 1986). This study is grounded in these basic principles of self-efficacy theory, although the questions to be investigated are specific to the escalation phenomenon. First, do self-percepts of low or high efficacy make it more likely that one will escalate commitment to a losing course of action? Second, do such beliefs affect the amount of resources invested, or the chance of failure willing to be taken, in an effort to turn a failing course of action around? In other words, is the escalation phenomenon more frequently manifested, and more severe, among those who believe or do not believe in their efficacy?

Although the proposition is reasonable that individual difference variables may have a main effect on escalating commitment, the search for relevant individual differences has not been particularly rewarding. For example, Teger (1980) found no effect on escalation for risk taking, locus of control, tolerance for ambiguity, or machiavellianism. Staw and Ross (1978) found no effects of dogmatism, tolerance for ambiguity, or self-esteem. Levi (1981) also found no effects for locus of control, mania, and depression on degree of escalation. In contrast, Knight and Nadel (1986) found a positive relationship between self-esteem and escalating commitment to a losing course of action. Similarly, Houser (1982) found that subjects with generalized feelings of self-competence were more likely to persist in playing the potentially entrapping carnival game. Also, Schaubroeck and Williams (1993) found an association between type A behavior pattern and commitment escalation. To this point, however, the results of the few studies investigating the relationship between individual differences and susceptibility to escalation have not been particularly encouraging.

Self-Efficacy and Escalating Commitment

Self-efficacy theory concerns people's judgments about their ability to perform actions that prospective situations demand. Self-efficacy assessments are judgments about how well one can perform in a specific situation, and have been demonstrated to contribute to motivation across a wide variety of situations. Discrepancies between goals and achievements are either motivating or deflating depending upon people's perceived capabilities to attain their objectives. Individuals who do not believe they possess the appropriate skills are easily discouraged when performance does not meet expectations. In contrast, those who believe in their ability to attain their goals increase their efforts when performance fails to match goals, and persist until success is attained (Bandura and Cervone, 1986). Efficacy judgments regulate how much effort people exert and how long they persist when met with resistance. In turn, these behaviors can strongly determine the outcomes ultimately obtained (Bandura, 1977, 1982).

The notion that people will exert greater effort and persevere or slacken off and give up in difficult endeavors, depending on whether they hold strong or weak beliefs in their efficacy, has been substantiated in many different situations (e.g. Bandura and Cervone, 1983, 1986; Bandura and Schunk, 1981; Brown and Inouye, 1978; Cervone and Peake, 1986; Schunk, 1981, 1984; Weinberg, Gould and Jackson, 1979). Increasingly, self-regulatory factors such as self-efficacy are considered relevant to the analysis of managerial decision making (Bandura and Wood, 1989; Wood and Bandura, 1989a,b; Wood, Bandura and Bailey, 1990). Anecdotal evidence also suggests that notions of self-efficacy can determine behavior in escalation situations:

Managers have often been rewarded ignoring short run disaster, for sticking it out through tough times. Successful executives—people whose decisions have turned out to be winners even when the outlook appeared grim—are particularly susceptible. It's tough for managers with good track records to recognize that a certain course isn't a satisfactory risk, that things aren't once again going to turn their way (Staw and Ross, 1987b, p. 69).

From self-efficacy theory, it can be inferred that individuals who possess high self-efficacy in making risky decisions will more frequently than others escalate commitment to a failing project. Similarly, such individuals will invest more resources and take greater risks to rescue a failing project. Individuals with self-percepts of high efficacy will evidence greater persistence because of their strong belief that persistence will result in successful task performance. It can also be predicted that individuals who possess low self-efficacy in risky decision making will less frequently than others engage in injudicious escalation. These individuals will also invest fewer resources and take fewer risks in an attempt to turn a failing policy around. Individuals of low self-efficacy will withdraw from failing situations because they distrust their capabilities and are easily discouraged by failure.

In addition to testing for the main effect predictions that persistence in error would be pronounced under conditions of high self-efficacy and diminished under conditions of low self-efficacy, we also examined whether an individual's level of chronic self-esteem is related to the tendency to escalate commitment to a losing course of action. Although many definitions have been offered, there is a consensus that self-esteem refers to individuals' degree of like or dislike for themselves, or in other words, to the favorability of individuals' typical self-evaluations (Brockner, 1988). Self-efficacy, in contrast, is concerned with individuals' beliefs about whether they can execute the behaviors required for success in a given situation (Bandura, 1977). The constructs of self-esteem and self-efficacy are conceptually distinct, because self-esteem is a judgment of self-worth or self-satisfaction, whereas self-efficacy is a judgment of task-specific capability. Hence, it is possible for an individual to be low in self-esteem but hold favorable efficacy beliefs and vice versa (Brockner, 1988).

Self-percepts of efficacy should be directly linked to how well one believes one can perform in escalation situations, because self-efficacy refers to judgments of personal capacity to deal with specific situations and will vary depending on the activity or environment. Self-esteem, in contrast, is conceptually decoupled from performance expectations in escalation situations, because self-esteem is a trait that encompasses how people affectively evaluate themselves across many different situations (Brockner, 1988; Gist and Mitchell, 1992). Consequently, the predictions implied by self-efficacy theory regarding the nature and extent of escalating commitment are clear and unequivocal, whereas predictions based on the notion of self-esteem are not. An efficacy measure of high specificity is therefore most relevant to predictions of specific levels of attainment in escalation situations.

We nonetheless chose to examine self-esteem's role in commitment escalation for primarily three reasons. First, findings regarding the role of self-esteem in commitment escalation are

inconsistent (e.g. Knight and Nadel, 1986; Sandelands, Brockner and Glynn, 1988; Staw and Ross, 1978). Second, although self-esteem is often compared to and confused with self-efficacy, there are important differences between them (Gist and Mitchell, 1992). One way to demonstrate this difference is in terms of their impact on escalating commitment.

Third, some controversy exists as to whether self-efficacy is best conceptualized as a situation and task-specific individual state or as a trait-like self-perception of the ability to meet the demands posed by disparate situations (Eden, 1988). Bandura (1986) argued that the former conceptualization and specific measures of self-efficacy are superior because self-efficacy relates to specific performances and varies across tasks. This position dominates in organizational psychology (Eden and Aviram, 1993). As a result, some researchers have developed their own measures of specific self-efficacy, including job seeking self-efficacy (Caplan, Vinokur, Price and van Ryn, 1989), computer self-efficacy (Gist, Schwoerer and Rosen, 1989), and self-efficacy for the job of entry level accountant (Saks, 1995). Other researchers suggest that general self-efficacy scales are less accurate than specific measures (e.g. Locke and Latham, 1990).

Personality psychologists in contrast regard self-efficacy as a trait. For example, Sherer, Maddux, Mercadante, Prentice-Dunn, Jacobs, and Rogers (1982) developed a general self-efficacy scale based on the notion that 'individual differences in general self-efficacy expectations exist [and that] these generalized expectancies should influence the individual's expectations of mastery in the new situations' (p. 664). Some evidence, however, suggests that scales employed to measure general self-efficacy and self-esteem lack discriminant validity. Eden and Aviram (1993) in pilot work measured self-esteem using the Rosenberg (1965) scale and general self-efficacy using the scale developed by Sherer *et al.* (1982). On the basis of correlations between general self-efficacy and self-esteem ranging from 0.75 to 0.91, Eden and Aviram concluded that each of these variables is a proxy for the other. Therefore, an association between self-esteem and escalating commitment implies a link between general self-efficacy and escalating commitment. For the reasons discussed, we believe that such a link is unlikely.

Method

Sample

A total of 132 subjects, 62 women and 70 men, participated in the study. The sample consisted of 59 graduate students and 73 senior undergraduate students of business administration enrolled in a course on organizational behavior at one of two large Canadian universities. Average age of subjects was 24.6 (*S.D.* = 4.6) years, and subjects possessed an average of 2.5 (*S.D.* = 3.7) years of full-time work experience.

Study design

A 3 × 3 (self-efficacy × scenario) mixed factorial design was used to determine the impact of self-efficacy on behavioral intentions in escalation situations. To facilitate generalizability of the conclusions regarding the role of self-efficacy in escalation situations, the self-efficacy manipulations were embedded within descriptions of three hypothetical investment decision scenarios. Three scenarios were used to provide multiple operationalizations of self-efficacy. Multiple operationalizations help avoid 'mono-operation bias' (Cook and Campbell, 1979), a common threat to construct validity in experimental research.

Each subject received a booklet containing the three decision scenarios. All three scenarios describe escalation situations, defined as 'predicaments where costs are suffered in a course of action and subsequent activities have the potential either to reverse or compound one's initial losses' (Staw and Ross, 1987a, p. 39). Subjects were asked to imagine themselves as administrators in charge of allocating resources to a failing project, and were given authority under conditions of slack financial resources to withdraw from, or escalate commitment to, the initially chosen course of action. Subsequent investment could turn the failing project around but was highly likely to be in vain and possessed an expected value of \$0.

All study participants were exposed to only one of the three self-efficacy conditions; hence, self-efficacy is a three-level between-subjects factor. All study participants were exposed to all scenarios, making the scenario variable a three-level, within-subjects factor. Scenario was balanced with respect to order of presentation using a Latin-square design, making order a three-level between-subjects factor. This design allows for the control and estimation of scenario content and order effects, and their related interactions. Subjects were randomly assigned to condition, with the constraint that each condition contains approximately the same number of subjects.

Procedure

The study was conducted during class time in four different classes. A brief standardized introduction to the study was given. Subjects were told the study was about decision making under risk and that they would be asked to respond to a set of decision problems. Subjects were asked to assume that the problems were real and to consider their choices carefully. Results of the study were used as the basis for later class discussion.

Stimulus materials

Each scenario was approximately 500 words in length, and provided a realistic context within which to situate the escalation dilemma. The scenarios described the choices facing (1) an investor in the stock market who must decide whether to sell shares that have declined in value and likely will decline some more; (2) a director of new product development who must decide whether to invest funds in a last-ditch effort to develop a new product ahead of the competition; and (3) a bank vice-president who must decide whether to make a high risk loan to protect an earlier investment. In addition to the contextual factors, scenarios contained financial information about the choice to be made, including amount of sunk costs incurred to date on the project, amount of additional investment available, probability of total loss of additional investment, probability of receiving a return on the additional investment, and the potential net return on additional investment. A summary of this information is found in Table 1.

To create a situation that would consistently induce escalating commitment to a losing course of action, all three scenarios required subjects to make a decision about the fate of an investment project in which considerable sunk costs have been incurred. Sunk costs refer to irrevocable commitments of resources. According to classical economic and normative decision theory, sunk costs should not be considered in decisions about future courses of action because they cannot be changed by future action. To conform to standard economic rationality, decisions should be made on the basis of future costs and benefits. Evidence, however, suggests that when individuals decide whether to continue an ongoing course of action, sunk costs matter (Arkes and Blumer,

Table 1. Summary of financial information

Scenario	Sunk costs (\$)	Amount of potential additional investment (\$)	Probability of total loss of additional investment	Probability of receiving a return on additional investment	Potential net return on additional investment (\$)
1	30,000	10,000	0.75	0.25	30,000
2	3,500,000	500,000	0.90	0.10	4,500,000
3	400,000,000	100,000,000	0.80	0.20	400,000,000

1985; Garland and Newport, 1991). The tenet that fixed, historical, and other sunk costs should not influence decisions is perhaps the most frequently violated normative principle of rationality (Thaler, 1986). Considering sunk costs relevant in decision making inclines individuals to escalate in an effort to avoid otherwise certain losses (Laughunn and Payne, 1984; Whyte, 1986).

To increase subject involvement in the study, subjects were told that they were personally responsible for incurring the sunk costs described in the scenarios. This information was also expected to increase the ability of the scenarios to elicit escalating commitment. The capacity of personal responsibility for incurring sunk costs to exacerbate a tendency towards escalation has been demonstrated in previous studies (e.g. Bazerman, Beekun and Schoorman, 1982; Caldwell and O'Reilly, 1982; Staw, 1976; Whyte, 1993).

Manipulation of self-efficacy

An individual's judgment of self-efficacy is typically based on four sources of information. In decreasing order of impact on self-efficacy, the sources are: (1) prior performance in similar situations; (2) observations of the performance attainments of others; (3) verbal persuasion and related social influence that one possesses relevant skills and abilities; and (4) physiological states from which people infer whether they possess certain capabilities (Bandura, 1982; Eden and Aviram, 1993; Gist and Mitchell, 1992). Studies confirm that all of these different sources of information can raise and strengthen self-percepts of efficacy, and that behavior reflects the level of self-efficacy change regardless of the source of information. The most influential source of self-efficacy information, however, is previous performance levels attained, provided such performance is largely attributable to ability. Verbal persuasion is also widely used to convince people they are able to achieve their goals (Bandura, 1986).

In the present study, we manipulated participants' perceptions of efficacy regarding their ability to make successful risky decisions by providing participants with different information from which to judge their personal capabilities. Although organizational psychologists have begun to treat self-efficacy as a variable that is amenable to manipulation (e.g. Garland and Adkinson, 1989; Eden and Aviram, 1993), sports psychologists have for some time manipulated self-efficacy to enhance or inhibit competitive performance (for a review see Weinberg, Gould, Yukelson and Jackson, 1981). Several studies indicate that because self-efficacy is not a personality variable, its strength is manipulable through information embedded in experimental instructions that are pertinent to subjects' ability to perform well on the task at hand (e.g. Bandura and Wood, 1989; Latham, Erez and Locke, 1988; Wood and Bandura, 1989b).

Numerous studies have been conducted in which self-efficacy has been systematically varied, with consequences for efficacy beliefs, action, and performance. For example, a number of

experiments have been conducted in which self-efficacy has been influenced by bogus feedback unrelated to one's actual performance (e.g. Weinber *et al.*, 1979; Jacobs, Prentice-Dunn and Rogers, 1984). Self-efficacy has also been manipulated by providing subjects with mastery experiences or by modelling coping strategies for them (Bandura, Reese and Adams, 1982). Another approach has been to introduce a factor devoid of competency information that might nonetheless alter self-efficacy. For example, Cervone and Peake (1986) investigated the role of anchoring and adjustment processes in individuals' assessments of self-efficacy. Subjects exposed to a random anchor representing a high level of task performance judged themselves to be more efficacious than subjects exposed to a random anchor representing a low level of task performance (Cervone and Peake, 1986). These divergent modes of efficacy induction have, in general, produced convergent results in causal tests of the impact of self-efficacy on motivation and action. Consequently, subjects in this study were randomly assigned to the high, low, or control self-efficacy conditions.

The experimental manipulations consisted of several sentences embedded in and tailored to each scenario. For example, in the stock market scenario, subjects in the high self-efficacy condition read the following:

You personally invested \$40,000 in the shares of a company a short time ago. Although you realized the investment was risky, you decided that the investment was probably a good one to make. Your track record in making risky stock market investments is very good. You obviously possess the skills required of a successful investor.

Subjects in this condition received persuasive encouragement and other information suggesting that they possessed the capabilities to initiate successful projects of the sort described as currently experiencing difficulties in the scenarios.

In the low self-efficacy condition of the stock market scenario, subjects read that they did not have a very good track record in making risky stock market investments, and that their skills as an investor were questionable. Self-efficacy was similarly manipulated in the other scenarios, although the precise wording of the manipulations was varied to reflect contextual differences.

Subjects in the control condition received no information regarding their level of skill, competence, or past experience in situations similar to the one at hand. Self-efficacy manipulations were designed to test the predictions that escalation would be greater in the high self-efficacy condition than in the control condition, and would be reduced in the low self-efficacy condition as compared with the control condition.

A schematic representation of the design is shown in Table 2. The term 'booklet' was used to denote each of the nine unique sets of stimulus materials used in this study. All booklets contain scenarios 1-3 and one of the three self-efficacy conditions, but each booklet pairs each self-efficacy manipulation with a different order of presentation of the scenarios. Each participant received one booklet.

Table 2. Combination and orderings of scenarios and self-efficacy conditions for each booklet

	Booklet version								
	1	2	3	4	5	6	7	8	9
Order of presentation	1a	1b	1c	2a	2b	2c	3a	3b	3c
within booklet*	1b	1c	1a	2b	2c	2a	3b	3c	3a
	1c	1a	1b	2c	2a	2b	3c	3a	3b

* Number refers to self-efficacy condition, lower case letters to scenario.

Measures

This study used three dependent variables: (1) decision whether to escalate commitment to a losing course of action; (2) percentage chance taken to rescue a failing project; and (3) amount of funds invested in the failing project. Participants provided data for decision, chance taken, and amount invested for each scenario.

The primary dependent variable is the choice whether to make the investment described. The choices were 'Yes', 'No', and 'Can't decide'. In all scenarios, a 'Yes' response is tantamount to a decision to escalate commitment to a losing course of action. This variable provides a direct measure of the frequency with which the escalation option is preferred over the project abandonment option.

Two other dependent variables pertain to subjects' strength or degree of commitment to the investment option. These variables quantify more accurately the extent to which subjects were committed to the escalation option. Subjects indicated the maximum amount of money, if any, that they would invest under the conditions described. Subjects also indicated the highest chance of losing additional investment that they would take to try to turn the losing course of action around.

For example, subjects choosing to retain the shares in scenario 1 were asked: 'If you chose to retain the shares although additional money may be lost, up to how much additional money are you willing to place at risk . . . to recoup the initial investment?' (response scale ranging from \$10,000 to \$40,000). Subjects choosing to retain the shares were also asked: 'If you chose to retain the shares although as a result there is a 75 per cent chance that they will become worthless, what would the chance that the shares would become worthless have to increase to before you would sell the shares?' (response scale ranging from 80–100 per cent).

Subjects who chose to sell the shares were asked whether there was any amount of money that they would be willing to place at risk to recoup the initial investment (response scale ranging from \$9000 to \$0). These subjects were also asked how low the chance that the shares would become worthless would have to fall to before they would retain the shares (response scale ranging from 70–0 per cent).

Before responding to the scenarios, participants completed the Rosenberg Self-Esteem Inventory (RSEI), a short form self-esteem scale (Rosenberg, 1965). Maximum score for the RSEI is 40, and high scores indicate high self-esteem. This scale has been shown to produce a reliable and valid measure of chronic self-esteem. Weiss (1977) and Weiss and Knight (1980) found internal reliability coefficients for this scale of 0.75 and 0.76 respectively. A 2-week test-retest reliability of 0.85, and correlations ranging from 0.56 to 0.83 between this and other self-esteem scales, have been reported (Robinson and Shaver, 1973). In the present study, mean score for the RSEI was 33.02, with a standard deviation of 4.36 and a coefficient alpha of 0.83. Similar values have been obtained with this scale in previous research (e.g. Knight and Nadel, 1986; Weiss, 1977, 1978; Weiss and Knight, 1980).

Results

Manipulation checks

Subjects completed a short questionnaire containing several filler and manipulation check items immediately after responding to the scenarios. Self-efficacy is typically measured by asking

people to rate their capability to attain certain levels of performance in the situation at hand (Bandura, 1977, 1982; Cervone and Peake, 1986; Wood and Bandura, 1989b). Two questions for each scenario were therefore designed to assess the success of the self-efficacy manipulations. The first question asked subjects whether they believed they could make the failing venture eventually succeed, and required a Yes/No response. The proportions of subjects responding 'Yes' to this question were 0.45, 0.60, and 0.65 in the low, control, and high self-efficacy conditions respectively. A multivariate analysis of variance was conducted for a repeated-measures design with one three-level between-subjects factor (self-efficacy) and one three-level within-subjects factor (booklet, with combined scenario and order effects). The proportion of 'Yes' responses to the first manipulation check question was the dependent variable. An arcsin transformation was performed on the proportions prior to analysis to stabilize variances, which tend not to be homogenous in the case of proportions (Winer, 1971). This analysis revealed a significant effect of the self-efficacy manipulation on subjects' perceptions of their ability to resolve the escalation situation successfully ($F(2, 129) = 4.05, p < 0.02$).

Planned comparisons were conducted between the experimental conditions and between each of the experimental conditions and the control condition. The difference between the low and high self-efficacy conditions was significant ($p < 0.008$), as was the difference between the low self-efficacy condition and the control condition ($p < 0.03$). The difference between the high self-efficacy condition and the control condition, although in the predicted direction, was not significant ($p < 0.59$).

The second manipulation check question asked subjects to estimate on a 0–100 scale their level of confidence that they would be able to turn the failing project around. Mean levels of confidence were 40.7, 45.3, and 52.4 in the low, control, and high self-efficacy conditions respectively. A multivariate analysis was conducted as described in the preceding paragraph, but with response to the second manipulation check question as the dependent variable. This analysis indicates a significant effect of the self-efficacy manipulation on subjects' level of confidence that they would be able to turn the situation around ($F(2, 129) = 3.97, p < 0.02$).

Planned comparisons indicate that the difference between the low and high self-efficacy conditions was significant ($p < 0.009$). The differences between the low self-efficacy condition and the control condition, and the high self-efficacy condition and the control condition, were in the predicted direction but were not significant ($p < 0.30, p < 0.11$, respectively).

These two manipulation checks together suggest that subjects in the high self-efficacy condition believed it more likely they would succeed if they persisted than subjects in the low self-efficacy condition, even though the objective probabilities of success were held constant across conditions. A third manipulation check question asked participants whether they agreed with the statement: 'You are very competent and skilled when it comes to selecting appropriate courses of action and making them pay off'. Responses were recorded on a 7-point scale anchored by 'strongly disagree' = 1 and 'strongly agree' = 7, with 4 representing 'neither agree nor disagree'. Mean responses were 3.0 ($S.D. = 1.9$), 4.6 ($S.D. = 1.3$), and 6.1 ($S.D. = 0.7$) in the low, control, and high perceived self-efficacy conditions respectively. A multivariate analysis revealed a significant effect of the self-efficacy manipulation on individual perceptions of ability to make successful risky decisions ($F(2, 129) = 52.3, p < 0.0001$). Planned comparisons indicate that the differences between each experimental condition and the control condition were significant at the 0.0001 level. The results from all three manipulation check questions support the view that the self-efficacy inductions were successful.

To investigate whether subjects considered sunk costs relevant in their decisions, we asked the following question: 'As the decision maker in each of the three scenarios, did you consider the existence of an initial investment in the courses of action described in the scenarios to be relevant

in deciding whether or not to risk additional funds?' Of 132 subjects, 118 (89 per cent) responded 'Yes' to this question. Subjects were also asked: 'How important was the existence of an initial investment in the courses of action described in the scenarios in deciding whether or not to risk additional funds?' Responses were recorded on a 5-point scale anchored by 'not at all important' = 1 and 'very important' = 5. Mean response to the question was 3.9 (*S.D.* = 1.1). Responses to both questions were statistically indistinguishable across the control and experimental self-efficacy conditions. These results indicate that subjects considered economically irrelevant sunk costs both relevant and important in their decisions about future courses of action. Because a sufficient condition to generate economically irrational escalation is the failure to disregard sunk costs in decision making, these results indicate that the scenarios induced psychological processes sufficient to lead to escalating commitment.

Dependent measures

To determine whether self-efficacy had a significant effect on intentions to escalate commitment to a losing course of action, multivariate and univariate analyses were conducted for a repeated measures design with one three-level within-subjects factor (booklet, with combined scenario and order effects) and one three-level between-subjects factor (self-efficacy). Only the univariate analyses will be reported since their findings are confirmed by the multivariate analyses.

By not including an additional three-level between-subjects factor representing the order in which scenarios were presented, the independent effects of scenario and order are confounded in the analysis. As a result, although the effects of these two variables are controlled for in the analysis, their effects and their interactions with the main variables of interest will not be independently assessed. Although the design allows for the effects and interactions of the control variables to be estimated, it would be superfluous to do so since these effects are not the subject of the present investigation.

Decision to escalate commitment

The proportions of subjects responding 'Yes' (escalate commitment), 'No' (abandon the project), and 'Can't decide' for all conditions and decision scenarios are summarized in Table 3. An arcsin transformation was performed on the proportion of 'Yes' responses prior to analysis. The results of the analysis indicate that self-percepts of efficacy had a significant effect on the frequency with which escalating commitment to a losing course of action occurred ($F(2, 129) = 8.24, p < 0.0004$).

Table 3. Proportions of subjects responding 'Yes' (escalate commitment), 'No' (abandon the project), and 'Can't decide' to the decision scenarios

Scenario	Self-efficacy condition								
	Low (<i>n</i> = 45)			Control (<i>n</i> = 43)			High (<i>n</i> = 44)		
	Y	N	CD	Y	N	CD	Y	N	CD
1	0.60	0.36	0.04	0.79	0.16	0.05	0.84	0.14	0.02
2	0.58	0.38	0.04	0.65	0.30	0.05	0.84	0.14	0.02
3	<u>0.62</u>	<u>0.29</u>	<u>0.08</u>	<u>0.67</u>	<u>0.26</u>	<u>0.07</u>	<u>0.80</u>	<u>0.16</u>	<u>0.04</u>
\bar{x}	0.60	0.34	0.06	0.71	0.24	0.05	0.83	0.14	0.03

Table 4. Mean maximum percentage chance taken of losing additional investment (standard deviation)

Scenario	Self-efficacy condition		
	Low	Control	High
1	69.8 (25.1)	75.6 (20.5)	80.7 (18.7)
2	77.2 (28.3)	84.2 (19.4)	91.2 (15.4)
3	71.4 (26.8)	74.2 (23.4)	79.4 (20.0)
\bar{x}	72.8	78.1	83.8

We also conducted planned comparisons (Keppel, 1982), which enabled us to determine more precisely how the self-efficacy manipulations affected participants' susceptibility to escalation. Intentions to escalate commitment to a losing course of action were expressed more frequently when information suggested specific competence was high than in the control condition ($F = 4.94, p < 0.03$). Intentions to escalate commitment were expressed less frequently when information suggested specific competence was low than in the control condition ($F = 4.39, p < 0.04$).

Chance taken

Subjects were asked to state the maximum percentage chance of losing additional investment they would take to turn the failing project around. The mean percentages for all conditions and scenarios are summarized in Table 4. The analysis of these data indicated that self-percepts of efficacy had a statistically significant effect on the extent to which subjects were prepared to escalate ($F(2, 129) = 6.27, p < 0.003$). The chance taken to rescue a failing course of action was greater in the high self-efficacy condition than in the control condition ($F = 4.85, p < 0.03$), and less in the low self-efficacy condition than in the control condition ($F = 3.16, p < 0.08$).

Amount invested

Subjects were asked to state for each scenario the maximum amount of money that they would be willing to invest in the circumstances described. To allow for comparisons to be made across scenarios and to combine amounts across scenarios, it was necessary to standardize amount invested. Recall that additional amounts described as available to be invested in each scenario, if invested, possessed an expected value of \$0. Subjects were then given an option to invest more, or less, than this amount. Amount invested by subjects was standardized by conversion to a percentage of the amount originally described as available for investment in each scenario. For example, if the project required an additional \$100 million as in scenario 3, and subjects were willing to invest as much as \$125 million, this amount would be converted to 125. Standardized amounts are summarized for all scenarios in Table 5.

Analysis indicated that self-efficacy had a significant effect on the amount of additional investment that subjects were prepared to devote to the failing policy, ($F(2, 129) = 7.10, p < 0.001$). Amount of additional resources invested was greater in the high self-efficacy condition ($F = 3.81, p < 0.05$), and less in the low self-efficacy condition ($F = 7.24, p < 0.01$), than in the control condition.

Subject responses on the dependent variables reveal a clear and consistent pattern. Subjects in the high self-efficacy condition were more inclined to engage in escalating commitment than subjects in the control condition, and were also willing to take greater chances and to invest more

Table 5. Standardized mean (standard deviation) amounts of additional investment

Scenario	Self-efficacy condition		
	Low	Control	High
1	80.7 (42.7)	113.7 (77.1)	114.2 (63.6)
2	81.2 (66.7)	99.5 (87.8)	123.7 (79.4)
3	80.5 (49.4)	97.4 (56.6)	115.2 (69.3)
\bar{x}	80.8	103.6	117.7

Table 6. Pearson correlation coefficients (self-efficacy, mean maximum percentage change taken)

Scenario	Self-efficacy condition		
	Low	Control	High
1	0.49*	0.71*	0.53†
2	0.62*	0.76*	0.10
3	0.62*	0.48†	0.31‡

* $p < 0.001$; † $p < 0.01$; ‡ $p < 0.05$.

Table 7. Pearson correlation coefficients (self-efficacy, amount of additional investment)

Scenario	Self-efficacy condition		
	Low	Control	High
1	0.59*	0.68*	0.57*
2	0.66*	0.64*	0.32†
3	0.60*	0.51*	0.21

* $p < 0.001$; † $p < 0.05$.

in an attempt to turn a failing course of action around. In contrast, subjects in the low self-efficacy condition were inclined to escalate less frequently, and to a more moderate degree in terms of chance of failure willing to be taken and additional resources committed, than subjects in the control condition.

We also calculated Pearson correlation coefficients for the amount that subjects were willing to invest in a losing course of action and self-efficacy. Self-efficacy was operationalized by responses to the self-efficacy manipulation check question asking subjects to estimate on a 0–100 scale their level of confidence that they would be able to turn the failing project around. We conducted the same analysis for self-efficacy and the highest chance of losing additional investment that subjects would take to try to turn the losing course of action around¹.

These analyses were performed to quantify the strength of the association between intentions to escalate commitment to a losing course of action and self-efficacy. The results are shown in Tables 6 and 7 and, in general, indicate a moderately strong positive linear association between self-efficacy and measures of escalation.

To examine whether efficacy beliefs operated comparably across scenarios, one-way ANOVAs on each of the three dependent measures were conducted for each scenario².

^{1,2} These analyses were suggested by a reviewer.

These analyses indicated a significant effect in the predicted direction of the self-efficacy manipulation on frequency, chance taken, and amount invested in both scenarios 1 and 2. In scenario 3, the differences were also in the predicted direction but were non-significant for frequency and chance taken ($F(2, 129) = 1.52$, $p < 0.22$; $F(2, 129) = 1.23$; $p < 0.30$, respectively).

Finally, Pearson correlation coefficients were obtained for the self-esteem score and responses to each of the three scenarios across all three self-efficacy conditions for both measures of escalation employing a ratio scale of measurement (chance taken and amount). None of the 18 correlation coefficients was significant at even the 0.10 level. Correlations were also obtained for the self-esteem score and both ratio scale measures of escalation taken in response to each scenario, collapsing across all three self-efficacy conditions. In this case, chance taken was negatively correlated with self-esteem in scenario 3 ($r = -0.17$), but at a marginal level of statistical significance ($p < 0.07$). The remaining five correlations were both positive and negative but none of these was even remotely significant.

Discussion

The results obtained in this study consistently confirmed predictions. As anticipated, intentions to escalate commitment were expressed more frequently and were more severe in the high perceived self-efficacy condition than in the control condition. Intentions to escalate commitment were expressed less often, and were less severe, in the low self-efficacy condition as compared with the control condition. This pattern was found in each of the scenarios used in this study, although the results were stronger for the stock market and new product development scenarios than for the bank loan scenario. Moreover, the data address the empirical question of whether chronic self-esteem is related to the escalation tendency. According to the present results, unlike those obtained by Knight and Nadel (1986) but similar to those obtained by Staw and Ross (1978), self-esteem was not a useful predictor of escalating commitment. Within this domain, these findings indicate the utility of a distinction between self-efficacy and self-esteem.

Recently, much research has focused on links between judgments of personal capabilities, or self-efficacy judgments, and task performance. The present findings provide additional evidence that positive self-efficacy assessments alone, without concomitant changes in subjects' competencies or potential outcomes, lead people to expend greater effort and to persist longer to attain their goals. These findings further attest to the generality of the relationship between perceived self-efficacy and motivation (Bandura and Cervone, 1983, 1986; Cervone and Peake, 1986; Locke, Frederick, Lee and Bobko, 1984). This work is extended to a new domain, escalation situations, in which positive self-efficacy judgments were found to significantly influence the propensity to escalate commitment to a losing course of action.

The prediction that self-efficacy judgments would lead to between-subject differences in intentions to escalate was confirmed, such that the higher the perceived self-efficacy, the greater the tendency to persist in a failing venture. This relationship can be explained by the differences in estimates across conditions of the likelihood that additional investment would turn the failing project around. Subjects in the high self-efficacy condition were more inclined to believe that they could successfully resolve the situation, even though the probability of project success was explicit and held constant across conditions. In contrast, previous research (e.g. Arkes and

Blumer, 1985; Garland, 1990) has examined and found no support for the notion that increasing the amount of sunk costs incurred on a failing project affects people's perception of the likelihood that a failing project can be saved.

Correlations between measures of self-efficacy and amounts willing to be invested, and between measures of self-efficacy and the chance willing to be taken to rescue a losing course of action, indicated a moderately strong positive relationship between self-efficacy and intention to escalate. This relationship appeared to be weakest for high self-efficacy. This difference, however, is explicable in terms of the restriction in the range of responses available given a decision to escalate. The decision to escalate, which is consistent with high self-efficacy, implies in each scenario the acceptance of substantial further investment and exposure to a high chance that the additional investment will be lost. For example, the decision to escalate in scenario 2 implies a willingness to expose oneself to at least a 90 per cent chance of wasting the additional investment. Few people, regardless of how efficacious they regard themselves to be, would willingly expose themselves to a much greater chance of loss than this. Even if they were willing to do so, their range of responses was restricted by a ceiling of 99 per cent. In contrast, people electing not to escalate commitment, which was more likely in the control and low self-efficacy conditions, could express a willingness to expose themselves to a chance of further loss of anywhere between 1 and 89 per cent.

The overwhelming impression made by the growing literature on self-efficacy is that high self-efficacy is a characteristic desirable to possess (Gecas, 1989). In several ways, high self-efficacy leads to beneficial consequences for individuals, organizations, and even society (Deci and Ryan, 1987). The present research, however, is unique in delimiting the extent of the virtues of self-efficacy. Conditions were specified under which high self-efficacy might be dysfunctional, and low self-efficacy functional, in an important category of managerial decision making. Basing one's goals on one's perceived capabilities usually has considerable functional value (Bandura, 1986; Bandura and Cervone, 1986), although not in escalation situations, where perceived self-efficacy for goal attainment increased motivation to escalate commitment to a failing venture.

The results of this study have implications for theories of motivation and leadership. According to social cognitive theory (Bandura, 1986), one method to increase motivation is to increase efficacy expectations. Also, theories of leadership such as path-goal theory (Evans, 1970, 1974; House, 1971; House and Mitchell, 1974) suggest that one dimension of effective leadership consists of cultivating high efficacy expectations on the part of subordinates (personal communication to first author from Evans and House). The present findings indicate that the strategy of increasing efficacy expectations has potential hidden costs that may become manifest in escalation situations.

The present findings also suggest that successful executives, those with a high level of skill and a history of selecting courses of action and making them pay off, are most likely to engage in the pursuit of a failing policy (Staw and Ross, 1987b). It is disconcerting that executives who are most at risk of injudicious commitment escalation are also most likely to be in a position to decide the fate of a losing course of action. Successful executives, however, are presumably better equipped than most to salvage a failing policy if that indeed is possible.

In contrast, those least likely to be in a position to influence events, those with a low level of perceived competence and a record of poor performance, are less likely to evidence entrapment and to do so to a more moderate degree. If individuals most likely to occupy positions of influence and to make the most important decisions are particularly vulnerable to entrapment, perhaps this in part explains the widespread occurrence of this phenomenon at the organizational level. Many of the most notorious examples of escalating commitment to a losing

course of action, such as American escalation in Vietnam, were the product of decisions made by talented and successful individuals. This is not to suggest that organizations should seek out or induce low self-efficacy, but that high self-efficacy may have a counter-intuitive effect on decisions taken in escalation situations. As a result, these situations require special attention. Persistence may be a virtue, but the decision to persist should be justified by the future net benefits of doing so, not by an overestimate of one's capability to turn a failing course of action around.

An issue worthy of investigation and related to the present study is the speed with and extent to which people's sense of efficacy rebounds and recovers from the adversity experienced in the pursuit of a failing policy. Resiliency of perceived self-efficacy is a possible determinant of the extent to which people persevere in the face of setbacks and obstacles. Continued failure may erode perceived efficacy and result in the eventual abandonment of a losing course of action. High self-efficacy individuals are people who in the face of failure are 'caught out on a limb', such that their self-assessments have been built up and then placed in doubt. Individuals, however, who possess resilient self-percepts of efficacy should be less influenced by repeated failure and more likely to persist. Research investigating the impact of the resiliency of perceived self-efficacy should provide greater insight into the motivation to persist in a losing venture (Bandura and Cervone, 1986).

This study has a number of limitations. For example, the possibility that the act of deciding whether to escalate affected self-efficacy rather than self-efficacy affecting choice cannot be ruled out. However, the sources of information from which an individual infers his or her self-efficacy are relatively well understood (Bandura, 1982; Gist and Mitchell, 1992). These sources do not include the act of choice, although they do include knowledge of the results of one's choices. In this study, subjects were asked to make choices but were not provided with information about decision outcomes. It therefore seems unlikely that responding to the scenarios as required of subjects would have affected self-efficacy.

Another study limitation includes the use of student subjects who indicated their behavioral intentions in response to escalation scenarios, raising obvious concerns about external validity. We attempted to address some of these concerns as suggested by Slade, Gordon and Schmitt (1986), by using senior undergraduate and graduate students of business administration who have demographic and interest profiles similar to those of practising managers. Future research investigating the link between self-efficacy and commitment escalation should focus on the behavior of experts making decisions in their area of expertise as they confront escalation situations in real time. One example might be to study the attributes and behavior of petroleum geologists as they confront the decision to abandon or escalate commitment to a site in which considerable resources have been invested but on which oil and gas has yet to be found (e.g. Garland, Sandefur and Rogers, 1990).

The starting point for this study was the assertion that any theory of escalating commitment that fails to account for important individual differences provides, at best, an incomplete explanation of persistence in a losing course of action. Consistent with this assertion, the results demonstrate that self-efficacy judgments have a significant effect on motivation to persist by affecting the nature of the perceived contingency between persistence and success in turning a failing project around. Consequently, the present findings contribute both to the growing literature on escalating commitment and to the literature on the self-efficacy mechanism of social cognitive theory, as well as provide the first link between these two literatures. Such findings also have implications for managerial practice and theory, to the extent that they help identify those types of individuals for whom escalation may be particularly tempting and remind us that confidence in our abilities is not always associated with positive outcomes.

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