

De-escalation of commitment in software projects: Who matters? What matters?

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Abstract

Through de-escalation of commitment (DoC), software projects with poor prospects for success may be sensibly abandoned and precious resources channeled to more productive uses. In spite of its importance, there has been little research on factors contributing to DoC in software projects. Using a laboratory experiment, this study investigates the impact of individuals (superiors and peers) and approach (shoulder blame and provide assurance) on DoC under varying conditions of sunk cost (high versus low). Results showed that, under conditions of low sunk cost, superiors who helped to shoulder blame (the shelter strategy) or provide assurance (the support strategy) appeared to be useful in facilitating DoC. Peers who helped to shoulder blame (the sharing strategy) or provide assurance (the sympathy strategy) also appeared to be useful in facilitating DoC, with the former strategy being particularly effective. But under conditions of high sunk cost, none of these four strategies appeared to be able to facilitate DoC. Implications of these results for practice are discussed.

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1. Introduction

Software development projects are difficult to manage. Studies have reported that project managers tend to continue expending precious resources on projects despite receiving signals that their projects were having problems [32]. This human tendency to persist in a failing course of action has been termed *escalation of commitment* [41]. As a result of this, individuals have often persisted for too long before abandoning projects that have poor prospects for success [12]. Over the past decade, researchers have

relied on experimental studies (e.g. [22]) and field studies (e.g. [30]) to understand the factors that led to escalation of commitment among individuals. Based on such understanding, researchers and practitioners have proposed (but not validated) some ways to alleviate the late stopping of failing projects or too early stopping of promising projects.

De-escalation of commitment (DoC) is the reverse, resulting in the termination or redirection of failing software development projects [23]. When software development projects have poor prospects for success, people should de-escalate commitment and halt these projects so that valuable resources (e.g. money, effort, and time) can be channeled to more productive uses elsewhere. There has been a paucity of research on DoC in the information systems literature [3]. However,

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research results from closely related disciplines provide hints about factors that may facilitate DoC among project managers [38]. While DoC can be studied from cognitive, behavioral, or action perspectives, this study takes a cognitive perspective because this covers the initial human decision that triggers behavior or action.

Measures suggested as possible remedies to an escalation of commitment tendency include stating limits to resources [17], considering alternative uses for resources [34], and giving visibility to resource expenditure [6]. By drawing attention to critical pieces of information about projects, these measures aim to help individuals make more objective decisions and de-escalate commitment if the situation warrants it. However, it may be difficult to implement these measures in software development projects [19]. Due to the volatile requirements of such projects [1], it may be difficult to state limits on resources in advance. Because of their complexity [28], it may be difficult to account for all resources and thus give visibility to the total resources expended. As people become engrossed in coping with the complexity of such projects, they may overlook alternative uses of resources. Due to these difficulties, project managers are frequently influenced primarily by social and psychological factors [40] when making decisions on whether or not to continue with a software development project.

Socially, individuals tend to be affected by their superiors or peers when making work-related decisions [11]. This is because they carry out their work within organizational structures that have reward and sanction systems, where superiors and peers are agents of evaluation [31]. Hence, individuals take the views of their colleagues seriously. Psychologically, human self-efficacy tends to be affected by outcomes of work-related decisions [36]. Individuals may worry about how their actions will be seen in the event of a failure. Two ways to alleviate such concerns are to help *shoulder blame* for the failure or merely *provide assurance*. Both approaches may mitigate the impact of the decisions on individuals and help them de-escalate commitment.

This study therefore investigates how social and psychological factors may facilitate DoC when software development projects have poor prospects for success. The research questions are:

- (a) Who matters? i.e. can individuals, such as superiors or peers, facilitate DoC?
- (b) What matters? i.e. can approaches such as shouldering blame or providing assurance facilitate DoC?

Numerous studies have reported that escalation of commitment is stronger when sunk cost is high [10]. This suggests that it may be harder to bring about DoC when sunk cost is high. Therefore, it is useful to examine the research questions under conditions of high and low sunk cost.

2. Literature and hypotheses

The theory of cognitive dissonance posits that individuals have a natural tendency to justify their decisions. To do so, they may distort information in the direction of their beliefs [7] or actively search for confirming information while disregarding contradicting information [9]. As a result, even when their projects have poor prospects of success, individuals tend to continue pouring resources into their projects. But instead of turning around projects, the commitment of more resources often leads to additional problems [35].

Justification has an internal and external orientation. *Internal justification*, or self-justification, is the tendency of individuals to assure themselves that their decisions are right. This perception can be affected by outcomes of their work-related decisions. They try to ensure that their decisions lead to favorable outcomes so as to reinforce their self-perception of competence. Their self-efficacy suffers when their decisions go wrong, especially after repeated or major failure. *External justification* is the need for individuals to assure others that their decisions are appropriate. This arises because individuals are often given “labels”, by others, based on the outcomes of their decisions [5]. For example, what others think of project champions are often influenced by their success. When decisions go wrong, individuals tend to lose credibility, inviting sanctions from others.

Internal justification may cause individuals to persist with projects that have poor prospects for success, resulting in an escalation of commitment tendency [4]. However, external justification tends to be the

Table 1
Strategies for DoC

What matters (approach)?	Who matters (individuals)?	
	Superiors	Peers
Shoulder blame	Shelter strategy	Sharing strategy
Provide assurance	Support strategy	Sympathy strategy

larger force motivating individuals to persist with projects [39]. Hence, if the motivation for individuals to justify their decisions externally can be reduced, there may be DoC. Two categories of people, to whom individuals frequently need to justify their decisions, are superiors and peers [44]. When decisions go wrong, two common ways that others can alleviate the need for individuals to justify their decisions are through shouldering blame and providing assurance (see Table 1). Shouldering blame removes assigned responsibility from individuals affected by negative outcomes while providing assurance merely gives confidence to individuals affected by negative outcomes.

2.1. Approaches

2.1.1. Shoulder blame

Blame involves assigning responsibility for negative outcomes to others [37]. Individuals have a tendency to take credit for positive outcomes and try to avoid blame for negative outcomes [33]. In the event of negative outcomes, if individuals are able to steer clear of blame, they may be less motivated to justify their decisions.

There are three common ways for people to reduce “personal damage”.

- (a) Blame outcomes on circumstances beyond control, such as environmental, technological, or other contextual change. This avoids having to implicate colleagues and straining working relationships.
- (b) Blame outcomes to the work of others [42]. While they may be responsible for the initial decisions, individuals can claim that subsequent efforts of colleagues caused the ultimate failure. The approach can negatively impact project team cohesion and aggravate the outcomes.

- (c) Encourage a cohesive culture in which colleagues voluntarily help to shoulder blame arising from negative outcomes [26]. Organizations may promote teamwork by emphasizing collective reward for positive outcomes and collective responsibility for negative outcomes.

Within this last culture, a superior of a project manager adopts a *shelter strategy* to help shoulder the blame as overseer of the software development project. Alternatively, each peer may adopt a *sharing strategy* to shoulder the blame within the work group.

2.1.2. Provide assurance

Assurance is the act of giving confidence to others, especially those affected by negative outcomes and needing confidence in decision-making. Project managers whose decisions may lead to negative outcomes can be assured if know that colleagues’ perception of their efficacy remains unchanged. Unlike shouldering blame, colleagues do not share the responsibility for the negative outcomes when they provide assurance. Although this does not eradicate responsibility, it still helps.

Individuals may benefit because there is:

- (a) No lowering of their self-efficacy (the perception of their ability to carry out a future task) [29]. With low self-efficacy, a project manager may feel scared of directing future projects.
- (b) Little or no negative impact on their the career prospects [13]. If individuals are vulnerable, they are highly motivated to keep their projects from failing, regardless of their prospects. To some extent, career prospects are contingent upon the opinions of superiors who can adopt a *support strategy* by assuring the project manager that opinion is not be affected by project outcome.
- (c) No reduction in job satisfaction [27]. Respect from peers enhances job satisfaction. If this respect is eroded by project failures, individuals may keep projects going regardless of their prospects. In practice, each peer of a project manager can adopt a *sympathy strategy* by assuring one another that mutual opinions are not be affected by project outcomes. When confronted with negative outcomes, such assurance may help to reduce the desire to justify decisions.

2.2. *Individuals (colleague types)*

2.2.1. *Superiors*

When software development projects have poor prospects for success, superiors may adopt the support or the shelter strategy to reduce the desire of individuals to justify their decisions by persisting with projects. A support strategy may be particularly effective for two reasons. First, superiors typically play a key role during performance appraisal [14]. By providing the necessary assurance, superiors can address any concern and reduce the urge of individuals to persist with failing projects. Second, many individuals like to have the autonomy to carry out their work and be respected for their decisions, regardless of the outcome. They are more likely to face their problems objectively if they know that their superiors have a high tolerance for failure.

The shelter strategy may be less effective but more effective than no strategy. By shouldering the blame, superiors take on much of the responsibility for failure. However, individuals usually want to maintain good working relationships with their superiors [16] and may be concerned that sheltering would adversely affect working relationships in the long term.

The level of sunk cost may moderate the impact of both strategies. The empirical literature has shown that escalation of commitment is stronger when sunk cost is high. Also, when sunk cost is low the losses of termination are less significant and the consequences less severe.

H1. When sunk cost is low, willingness to terminate software projects with poor prospects (DoC) will be highest with the support strategy (superiors provide assurance), followed by the shelter strategy (superiors shoulder blame), and finally no strategy.

H2. When sunk cost is high, willingness to terminate software projects with poor prospects (DoC) will be the same with the support strategy (superiors provide assurance), the shelter strategy (superiors shoulder blame), and no strategy.

2.2.2. *Peers*

When software development projects have poor prospects for success, peers may adopt a sharing or sympathy strategy. Either of these strategies can facil-

itate DoC, compared to having no strategy at all. A sharing strategy may be particularly effective for two reasons. First, peers who share the consequences of project failure tend to be less concerned about outperforming each other; they are more likely to face problems objectively and halt them instead of persisting too long [43]. Second, individuals may be less concerned that their career prospects can be marred by one failure, giving them confidence to face their problems objectively.

Again, a sympathy strategy may be less effective in facilitating DoC but more effective than none at all. With assurance from peers, individuals may be less concerned about loss of respect when their project fails [18]. However, even with assurance from their peers, individuals may sometimes still want to persist because they may have an innate desire to avoid being a poor performer.

As before, the level of sunk cost may moderate the impact of the two strategies: the sympathy and the sharing strategy may be effective with low but not with high sunk cost.

H3. When sunk cost is low, willingness to terminate software projects with poor prospects (DoC) will be highest with the sharing strategy (peers shoulder blame), followed by the sympathy strategy (peers provide assurance), and finally no strategy.

H4. When sunk cost is high, willingness to terminate software projects with poor prospects (DoC) will be the same with the sharing strategy (peers shoulder blame), the sympathy strategy (peers provide assurance), and no strategy.

3. *Methodology*

The laboratory experiment used a $3 \times 2 \times 2$ factorial design. The three independent variables were approach (shoulder blame versus provide assurance versus do nothing), individual (superiors versus peers), and sunk cost (high versus low).

3.1. *Subjects*

A total of 360 senior information systems undergraduates at a large university voluntarily completed

this study. On average, the subjects were 22 years old and had 1.4 years of work experience. About 53% were males and 47% were females. Subjects were randomly assigned to the 12 treatments in equal numbers (30 subjects per treatment) to minimize confounding effects of subject characteristics on the results. The success of this random assignment process was checked. Subjects who completed the study received monetary payment.

3.2. The scenario

Subjects received a case scenario adapted from [24]. They played the role of project managers in MaxTech Corporation, a computer software company. The company had been working on a very promising and lucrative software development project. The goal of this project was to develop MaxSolve, an enterprise software product that could integrate the major organizational functions, for sale to large organizations in several industries. By integrating and improving business practices, MaxSolve could help these organizations to respond quickly to environmental change. The critical capabilities of MaxSolve included accounts management, inventory management, production management, quality management, plant maintenance, sales distribution, and human resource management. As initiator for this software development project, subjects had had to make all critical decisions pertaining to this project.

In all cases, subjects were told that the system had a US\$ 10 million project budget. Also they were told that the project was on budget (we wished to alleviate confounding effects due to optimistic or pessimistic feelings about the technical outcome [8]):

- (a) For the low sunk cost treatment, they were told that 25% had been expended and that MaxSolve was 25% completed.
- (b) For the high sunk cost treatment, subjects were told that 75% had been expended and that MaxSolve was 75% completed.

However, at this point, the subjects were told that a competing computer software company had launched a competing software product, BetterSolve, into the market. The product had been designed with exactly the same business objectives and, more important, a

careful analysis of BetterSolve revealed that it had much better capabilities and greater ease of use than MaxSolve was likely to provide. Moreover, this had not been the first time that a competing software product had been discussed. There had been several previous warnings of impending problems. Thus, the goal of this scenario was to portray MaxSolve as a software project with poor prospects for success.

Subjects had been randomly assigned to one of the following environments (with information representing a strategy to facilitate DoC):

- (a) *No strategy (superiors do nothing)*: Subjects were told that their superiors were aware of the decision to initiate the MaxSolve project.
- (b) *Shelter strategy (superiors shoulder blame)*: Subjects were told that their superiors (as individuals) would take the blame and share the responsibility for the outcome. The superiors were aware of the decision to initiate the MaxSolve project and the organizational culture encouraged collective responsibility.
- (c) *Support strategy (superiors provide assurance)*: Subjects were told that their superiors (as individuals) had given them assurance that opinions about them would not be affected by the outcome of the project. Their superiors were aware of the decision to initiate the MaxSolve project and the organizational culture encouraged learning from mistakes.
- (d) *No strategy (peers do nothing)*: Subjects were told that their peers were aware of the decision to initiate the MaxSolve project.
- (e) *Sharing strategy (peers shoulder blame)*: Subjects were told that their peers (as individuals) would share the responsibility for the outcome of the project. This was because their peers were aware of the decision to initiate the MaxSolve project and the organizational culture encouraged collective responsibility for outcomes.
- (f) *Sympathy strategy (peers provide assurance)*: Subjects were told that their peers (as individuals) had given them assurance that their opinion of them would not be affected by the outcome of the MaxSolve project. Peers had been aware of the decision to initiate the MaxSolve project and the organizational culture encouraged learning from mistakes.

They were then asked to state their intent to terminate the MaxSolve project in terms of a probability from 0% (meaning definitely would not terminate) to 100% (meaning definitely would terminate). After completing this experiment, subjects were asked to provide background information, responded to several questions, and indicated the two most important factors affecting their decision (for manipulation and control checks). Before they left, subjects were debriefed on the purpose of the experiment.

4. Analyses and results

All statistical tests were carried out at a 5% significance level.

4.1. Manipulation and control checks

The importance of sunk cost was checked using two statements: “We have already spent a large portion of the MaxSolve project budget” and “The MaxSolve project has already consumed a lot of resources”. Both were anchored on a 7-point Likert scale from “strongly disagree” (1) to “strongly agree” (7). Subjects given the high sunk cost scenario (mean = 6.11, S.D. = 0.78 and mean = 5.91, S.D. = 0.67, respectively) agreed to both questions significantly more ($P < 0.01$) than subjects given the low sunk cost scenario (mean = 2.87, S.D. = 1.01 and mean = 2.97, S.D. = 1.05, respectively).

The effect of strategy (individual and approach) was checked based on the two most important factors affecting decisions of subjects (Table 2). Kruskal–Wallis tests revealed that (i) the percentage of subjects

indicating ‘superiors shoulder blame’ among the two most important factors was significantly higher in the shelter strategy treatment (90%) than in others ($P < 0.01$), (ii) percentage of subjects indicating ‘superiors provide assurance’ among the two most important factors was significantly higher in the support strategy treatment (85%) than in other treatments ($P < 0.01$), (iii) percentage of subjects indicating ‘peers shoulder blame’ among the two most important factors was significantly higher in the sharing strategy treatment (85%) than in other treatments ($P < 0.01$), and (iv) percentage of subjects indicating ‘peers provide assurance’ among the two most important factors was significantly higher in the sympathy strategy treatment (87%) than in other treatments ($P < 0.01$). The experimental manipulation of strategy appeared to be effective.

The manipulation of project prospects was checked using two questions: “The MaxSolve project has good prospects for success” and “The MaxSolve project will be a success in the software market”. Both questions were anchored on a 7-point Likert scale from “strongly disagree” (1) to “strongly agree” (7). Responses of subjects to both questions (mean = 2.54, S.D. = 0.84 and mean = 2.57, S.D. = 0.83, respectively) showed that they believed the MaxSolve projects had poor prospects. An ANOVA test revealed that these responses did not differ significantly across various treatments.

ANOVA tests showed that subjects in various treatments did not differ significantly in terms of age and work experience. Kruskal–Wallis tests and Mann–Whitney tests revealed that the gender ratio of subjects did not differ significantly across treatments. Controls over subject characteristics, enforced through random

Table 2
Manipulation checks for strategy

Strategy (individual and approach)	Percentage of subjects indicating factor among the two most important			
	Superiors shoulder blame	Superiors provide assurance	Peers shoulder blame	Peers provide assurance
No (superiors do nothing)	18	20	18	20
Shelter (superiors shoulder blame)	90	8	8	12
Support (superiors provide assurance)	8	85	10	8
No (peers do nothing)	13	10	10	13
Sharing (peers shoulder blame)	10	10	85	10
Sympathy (peers provide assurance)	8	8	10	87

Table 3
Descriptive statistics for dependent variable

Individual	Sunk cost	Approach	Willingness to terminate		Number of subjects
			Mean	S.D.	
Superiors	Low (H1)	Do nothing	33.3	15.8	30
		Shoulder blame	44.3	13.3	30
		Provide assurance	49.7	17.5	30
	High (H2)	Do nothing	17.0	12.4	30
		Shoulder blame	19.7	15.4	30
		Provide assurance	20.0	12.6	30
Peers	Low (H3)	Do nothing	28.7	14.6	30
		Shoulder blame	57.7	15.9	30
		Provide assurance	43.7	13.5	30
	High (H4)	Do nothing	19.3	12.6	30
		Shoulder blame	23.7	14.3	30
		Provide assurance	20.0	12.9	30

assignment of subjects to various treatments, appeared to be effective.

4.2. Hypotheses tests

Table 3 summarizes descriptive statistics for the dependent variable. Table 4 reports the results of an ANOVA test involving the three independent variables and the dependent variable (which met the homogeneity and normality requirements of this test). Main effects were found for sunk cost ($F = 231.3$, $P < 0.01$) and approach ($F = 21.8$, $P < 0.01$). There were two-way interactions between sunk cost and approach ($F = 11.5$, $P < 0.01$) and between people and approach ($F = 5.8$, $P < 0.01$). In addition, there was a three-way interaction among all independent variables ($F = 3.1$, $P < 0.05$). Interpretation of the three-way interaction should take precedence over all other results [25]. To examine this, the data was divided into two subsets (i.e. data for treatments involving superiors were separated from data for treatments involving peers). Separate analyses were carried out for each data subset.

For the data subset involving superiors, an ANOVA test yielded main effects due to sunk cost ($F = 116.7$, $P < 0.01$) and approach ($F = 6.9$, $P < 0.01$), and an interaction involving sunk cost and approach ($F = 3.2$, $P < 0.05$) (see Table 5). Interpretation of the interaction should take precedence. To examine

this interaction, the data subset was further divided along sunk cost (i.e. data for high sunk cost treatments were separated from data for low sunk cost treatments). With low sunk cost, there was a main effect for approach ($F = 8.5$, $P < 0.01$). Tukey–Kramer

Table 4
Results of ANOVA test for entire dataset

	d.f.	SS	F	P
Sunk cost	1	47380	231.3	0.01**
Individual	1	203	1.0	0.32
Approach	2	8945	21.8	0.01**
Sunk cost \times individual	1	34	0.2	0.69
Sunk cost \times approach	2	4707	11.5	0.01**
Individual \times approach	2	2362	5.8	0.01**
Sunk cost \times individual \times approach	2	1258	3.1	0.05*

* $P < 0.05$.

** $P < 0.01$.

Table 5
Results of ANOVA test for data subset involving superiors

	d.f.	SS	F	P
Sunk cost	1	24969	116.7	0.01**
Approach	2	2963	6.9	0.01**
Sunk cost \times approach	2	1361	3.2	0.05*

* $P < 0.05$.

** $P < 0.01$.

Table 6
Results of ANOVA test for data subset involving peers

	d.f.	SS	F	P
Sunk cost	1	22445	114.7	0.01**
Approach	2	8343	21.3	0.01**
Sunk cost \times approach	2	4603	11.8	0.01**

** $P < 0.01$.

HSD revealed that shouldering blame (shelter strategy) and providing assurance (support strategy) yielded greater willingness to terminate the project than doing nothing (no strategy). H1 was partially supported. With high sunk cost, there were no significant effects due to approach ($F = 0.4$, $P = 0.64$). Willingness to terminate the project did not differ significantly between shouldering blame (shelter strategy), providing assurance (support strategy), and doing nothing (no strategy). H2 was supported.

For the data subset involving peers, an ANOVA test detected main effects due to sunk cost ($F = 114.7$, $P < 0.01$) and approach ($F = 21.3$, $P < 0.01$), and an interaction involving sunk cost and approach ($F = 11.8$, $P < 0.01$) (see Table 6). As above, this interaction was examined by dividing the data subset along sunk cost. With low sunk cost, a main effect for approach ($F = 29.2$, $P < 0.01$) was detected. Tukey–Kramer HSD showed that shouldering blame (sharing strategy) resulted in greatest willingness to terminate the project, followed by providing assurance (sympathy strategy), and then doing nothing (no strategy). H3 was supported. With high sunk cost, there were no

significant effects due to approach ($F = 0.9$, $P = 0.40$). Willingness to terminate the project did not differ significantly for shouldering blame (sharing strategy), providing assurance (sympathy strategy), and doing nothing (no strategy). H4 was supported.

5. Discussion and implications

Fig. 1 summarizes the experimental results, which answer the research questions. Under conditions of low sunk cost, superiors can adopt the shelter strategy (by shouldering blame) or the support strategy (by providing assurance) to facilitate DoC by individuals. Peers can adopt the sharing strategy (by shouldering blame) or the sympathy strategy (by providing assurance) to facilitate DoC by individuals (the former strategy being more effective). Alternatively, superiors who provide assurance (the support strategy) are likely to be as effective as peers who do likewise (the sympathy strategy) in facilitating DoC (comparing points A and B in Fig. 1). But peers who shoulder blame (the sharing strategy) are likely to be more effective than superiors who do likewise (the shelter strategy) in facilitating DoC (comparing points C and D in Fig. 1). However, under conditions of high sunk cost, all these strategies do not appear to facilitate DoC.

5.1. Discussion of findings

Prior research has attempted to control escalation of commitment by drawing human attention to resources

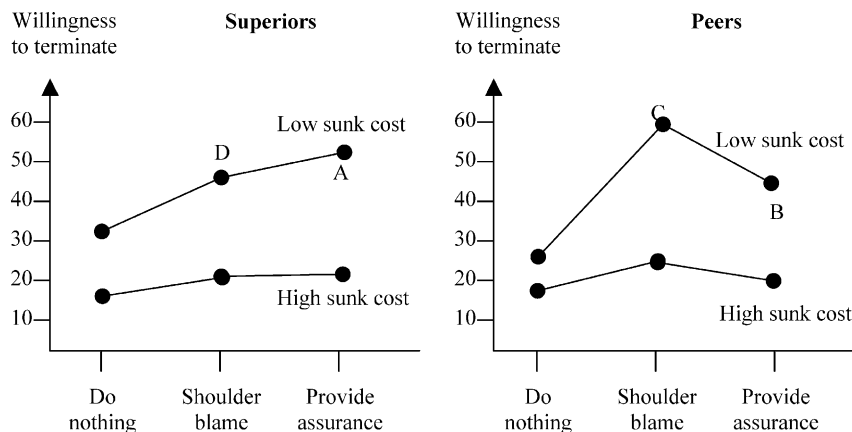


Fig. 1. Graphical summary of results.

available or expended. But in reality, human decisions are often guided by social and psychological factors (rather than hard facts) because of the intangible nature and volatile requirements of such projects.

Although earlier studies have suggested that social and psychological factors may affect escalation of commitment, these factors have been assumed to affect DoC in the opposite direction (i.e. symmetrical influence) without empirical testing. Results of this study demonstrate that having superiors or peers to help shoulder blame or provide assurance do affect human decisions on software development projects. Among the four strategies that have been shown to facilitate DoC when sunk cost is low, the sharing strategy (peers shoulder blame) appears to be the most effective. These results suggest that superiors are not always the strongest source of influence in human decision-making. Peers can help to facilitate DoC too.

In addition, this study made an initial attempt at examining the relative importance of internal versus external justification for DoC. Providing assurance helps to remove the need for external justification but it does not eradicate responsibility for negative outcomes (and internal justification). Shouldering blame helps to remove the need for external justification as well as some responsibility for negative outcomes.

Level of sunk cost has been shown to moderate the impact of social and psychological factors on DoC. Prior research has reported that high sunk cost can trigger strong escalation of commitment. In our study, the level of sunk cost (which triggers escalation of commitment) and the four strategies which facilitate DoC can be seen as opposing forces affecting human decisions. Under conditions of low sunk cost, impact of these strategies seems to prevail over that of sunk cost, thereby resulting in DoC. But under conditions of high sunk cost, impact of these strategies appears to be negated by that of sunk cost. Hence, these strategies fail to bring about DoC. In a broader sense, these research results suggest that the success of any attempts to facilitate DoC through social and psychological means may be contingent upon the context of the software development projects (e.g. level of sunk cost).

5.2. *Implications of findings*

Because of the intangible nature and volatile requirements of software development projects, it is

quite common for project managers to exhibit a tendency to escalate commitment [21]. This can be particularly acute in situations involving software development projects that use advanced technologies or projects that are large and complex [45]. To cope with such situations, some means have been prescribed to help individuals resist escalation.

Our study suggests that organizations may be able to facilitate DoC among project managers by creating an organizational culture that is conducive to such behavior: one that encourages collective responsibility for project outcomes (where superiors or peers help to shoulder blame through the shelter or the sharing strategy). As shown here, the sharing strategy among peers may be particularly effective. Organizations can implement this strategy by having a reward system for teams of project managers with an individual and a collective component. While collective reward can reinforce the sharing strategy, individual reward can deter irresponsible behavior by project managers (who know that their peers help to shoulder blame). Hewlett-Packard is an organization that has benefited significantly from a culture that encourages collective responsibility. Learning from mistakes may also bring about DoC among project managers. To pursue these strategies, organizations need to avoid evaluating project managers based on any specific project. Project managers can be evaluated on their performance for a collection of software development projects. 3M is an organization that has benefited significantly from a culture that encourages learning from mistakes.

The four strategies to facilitate DoC may only be effective at low but not high sunk cost. Thus, when sunk cost is high and escalation of commitment tendency is strong, organizations may need to complement these strategies with other means to facilitate DoC. A combination of means (or critical events) is often needed when sunk cost is high [20].

5.3. *Limitations of study*

Results of our study should be interpreted with some limitations in mind. First, it used an experimental setting with student subjects. They may not have the same emotional attachments as managers of actual software development projects. Moreover they could shrug it off as “just another job to do while

graduating”. The difficulty of generalizing results from student subjects to actual managers has been documented [15]. However, for tasks involving human decision-making (as in this study), studies have reported that results obtained do sometimes apply to actual managers (e.g. [2]).

Second, this study employed an artificial scenario that involved a few key factors. To maximize internal validity, the number of factors manipulated and studied had to be kept small (three in this case). In reality, a plethora of other factors may affect human decisions on software development projects. Nevertheless, the impact of an artificial scenario may be amplified in complex scenarios. Social psychology research reveals that individuals usually do not evaluate all available information in complex scenarios but simplify their scenarios by considering only a few factors.

Third, our study restricted individuals to a single decision continuum (their willingness to terminate the software development project). In practice, project managers may have other options open to them. For example, they can change the scope of the project, redirect it by altering its objectives, or allocate project resources to other uses. Availability of these decision options may affect the effectiveness of the four strategies.

6. Conclusion

As project managers cope with new and bigger challenges of managing software development projects, there is a danger that escalation of commitment could lead to more wastage of resources. Prior research on DoC has suggested drawing attention of management to resources available to or expended by projects.

This study has contributed by demonstrating that social and psychological factors may also facilitate DoC in the context of software development projects. Specifically, this study shows how superiors and peers may play a role (by helping to shoulder blame or provide assurance) to help individuals de-escalate their commitment to software development projects that have poor prospects for success. It also illustrates that the effectiveness of such de-escalation strategies may be contingent upon the project context (e.g. level of sunk cost).

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