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Evaluating Escalating Managers' Performance with Outcome Knowledge: Experimental Evidence and Implications for Project Management

Young-Won Her [1]

David Nazarian College of Business & Economics Department of Accounting
California State University, Northridge

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A B S T R A C T

This study investigates how the escalating behavior by project managers and the subsequent outcome affect evaluations of their decision performance, which is an important but unanswered question in prior escalation research. A decision-making experiment was conducted to examine the role of these factors in performance appraisal by asking 117 student participants to evaluate the decision performance of a hypothetical project manager. The results indicate that a manager's decision to escalate his commitment to a failing project has a negative effect on performance evaluation. The evaluations are also affected by the outcome valence (successful or unsuccessful) perceived by evaluators although this ex post information is not indicative of the decision quality. Additionally, there is a significant interaction effect found between the escalation decision and the outcome valence, suggesting that evaluators tend to take a more cautious attitude toward the decision quality in their appraisal process when they receive negative outcome than positive outcome information. The implications of findings for practice and for future research are discussed.

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[1] Email: youngwon.her@csun.edu

1. Introduction

A significant body of research has documented the anecdotal evidence on escalation of commitment by project managers (Yang et al., 2023; Sleesman, 2019; Devigne et al., 2016; Hsieh et al., 2015; Drummond, 2014; Gomez & Sanchez, 2013; Denison, 2009; Whyte & Saks, 2007). The typical finding from this stream of research is that managers sometimes become overly committed to their projects and this over-commitment, surprisingly, appears more apparent when they receive negative rather than positive feedback about the future of their projects. This paradoxical phenomenon where a failing project continues to be funded instead of being abandoned or redirected has been known as the escalation effect in the project management context (Sleesman, 2019; Behrens & Ernst, 2014; He & Mittal, 2007).

A considerable amount of research has been undertaken to explore what causes such irrational resource allocation decisions and how this dysfunctional behavior can be mitigated (Ohlert & Weißenberger, 2020; Brüggen & Luft, 2016; Sarangee et al., 2014; Behrens & Ernst, 2014; Sleesman et al., 2012; Kadous & Sedor, 2004). It should, however, be noted that the primary focus of prior escalation research has been on the part of a decision maker as an "actor" and no attention has been paid to the part of a performance evaluator as an "observer." This is understandable because the nature of the central issues raised with this topic directs researchers' attention toward the decision maker who is subject to escalation and how such costly behavior can be suppressed. The present study, however, proposes that escalation research should extend its boundary to the point where the role of a performance evaluator can also be examined since the actor and observer are both important players in this unique phenomenon.

Staw (1981), although he hoped to reject his conjecture, may be correct to suggest that the escalation phenomenon might represent a post-hoc reconstruction of events by observers (Bowen, 1987). In fact, in many cases, the ultimate judgment on whether a decision maker's action was appropriate or not is made by observers, typically after the associated outcome information is available. Therefore, this type of ex post judgment by observers may be inefficient or even fallible since the issue of escalation, by the definition, will be raised only when the eventual outcome turns out to be negative. Further, it has been suggested that the tendency of managers to escalate their commitment may be influenced by the nature of performance evaluation systems by which their actions and decisions are observed and evaluated (Liang, 2019; Kadous & Sedor, 2004; Frederickson et al., 1999). This indicates that it may also be important to consider the judgmental role of observers in the escalation context for a fuller understanding of the phenomenon. As such, the research in this field may not be complete until this additional issue is addressed: how evaluators perceive the manager's escalating behavior? The current study seeks to answer this question which has been largely ignored in prior literature.

Bowen (1987), in his critical review of earlier escalation research, argued that the post-hoc practice of labeling certain decisions as "errors" (presumably because of the negative outcomes resulted) may be misleading in some cases. Although his major intention in this argument is to emphasize the uncertainty that might have existed in the decision situations faced by managers who are blamed for their escalation, it also implies that performance evaluations by observers are inherently vulnerable to the "outcome effect."

The outcome effect refers to the phenomenon whereby performance evaluators systematically overweight their outcome knowledge in assessing a manager's decision performance, and thereby developing their evaluative judgement in the direction of the outcome known (Chen et al., 2021; Mertins et al., 2013). Thus, when the outcome turns out to be positive (negative), evaluators tend to evaluate the manager more positively (negatively), regardless of the actual appropriateness of the decision which resulted in that outcome. Since it is possible that the escalation of commitment by managers may bring a turnaround of the situation and a positive as well as a negative consequence (although less likely), evaluating managers' decision performance in the escalation context may also be susceptible to the outcome effect. To explore this issue in the context of project escalation, the study incorporates outcome information as another important research variable. Accordingly, the

main objective of this study is to investigate how managers' project management behavior (either escalating or non-escalating) and the information about its resultant outcomes (either good or bad) affect evaluators' assessments of the managers' decision-making performance.

A case study-based experiment, in which participants were asked to evaluate a hypothetical project manager's decision performance, was performed to test the hypotheses that managers who discontinued their existing project in favor of a better alternative project will be more favorably viewed by evaluators than managers who continued their current project despite its anticipated lower profitability, and that a successful outcome will lead to a more favorable evaluation than will an unsuccessful outcome. The experimental findings of this study supported the predicted relationships. A manager who decided to escalate his commitment to a failing project was less favorably evaluated than a manager who did not exhibit such escalating behavior. The evaluations were also influenced by the outcome valence (successful or unsuccessful) even though this ex post information could not be an indicative of the decision quality. As such, decision appropriateness and outcome information were both important determinants of assessing managers' decision quality, although the outcome knowledge turned out to be apparently a dominant factor in the current study.

The major contribution of this study is to integrate two independent research streams in the areas of escalation of commitment and outcome effects to consider an important research question which is otherwise difficult to be addressed by separate research endeavors. Another important contribution is that the study provides implications for the way performance evaluation systems are designed and implemented by management. The results of this study show that a manager's escalating behavior may be appraised in a significantly different manner depending upon the subsequent outcomes. The consequence of such evaluations may have costs for organizations: managers who made an improper escalating decision may be praised and rewarded because of an unexpected positive outcome. Conversely, managers who made an appropriate decision may be blamed and punished because of a negative outcome which was expected to be less probable at the time of their decisions. Both instances have negative impacts on the generalization of valid organizational learning as they may subvert rules, policies, and procedures maintained by organizations to guide their members' professional judgement and decision-making. It is thus important for companies to be aware of the findings of this study and to consider its implications for the design of their evaluation and feedback systems.

The remainder of this paper is organized as follows. A brief review of extant literature on both escalation of commitment and outcome effects follows this section. A series of hypotheses focusing on the research question raised by this study is then developed. In the following section, the procedures used to perform the experiment which tests the hypotheses are described. The analysis procedures and the results of the experiment are then summarized. Finally, implications of the findings, limitations of the study, and some suggestions for future research are discussed.

2. Literature Review and Hypotheses

2.1 Research on the Escalation of Commitment

Due to its costly behavioral implications, the escalation of commitment by managers in a firm has been one of the most intensively researched topics in the area of organizational behavior and management accounting. A substantial body of research in this area suggests that managers persist in committing resources to their projects even after receiving negative feedback that the initial investment has not reached its goals (Sleesman et al., 2012). A need to justify their previous decision, which is thought to be driven by personal responsibility for the negative consequence, was proposed as the main motivation for this seemingly irrational decision behavior (Gomez & Sanchez, 2013; Schultze et al., 2009; Staw, 1981). That is, in committing more resources to their prior decision, managers are described to hope to prove that they were not erroneous in their initial judgment or choice.

This type of affective explanations based on the psychological perspective, however, was not successful in covering all kinds of empirical evidence reported because some findings were not in accordance with the prediction based on such explanations. For example, contrary to the justification theory, some studies found that escalation still occurred even when managers were not personally

responsible for the prior decisions (Arkes & Blumer, 1985) and when negative feedback could be attributable to external events, which should have lessened managers' feelings of responsibility (Staw & Ross, 1978). In some instances, managers demonstrated rational decision behavior even though the conditions faced by these managers were conducive to escalation (Whyte & Saks, 2007; Leatherwood & Conlon, 1988).

Accordingly, subsequent research efforts in this area were directed at finding new approaches which may either complement the existing psychological model or provide better explanations for the irregularities detected in prior studies. A good example is Harrell and Harrison's study (1994). They suggested that the conflicting results in prior escalation research may be resolved by applying the expanded view of rational economic decision-making assumed by agency theory. To test this idea, they assessed the viability of two agency theory concepts, an incentive to shirk and privately held information, in addressing the escalation issue. Their results indicated that managers' escalation behavior is conditional on the existence of these two agency theory constructs, confirming the potential usefulness of this alternative approach.

Another example can be found in a group of studies that have attempted to improve the existing models by rectifying either conceptual or methodological flaws identified in earlier experiments (Victoravich, 2010; Denison, 2009; Schulz-Hardt et al., 2009; He & Mittal, 2007; Harrison & Harrell, 1995). These studies typically argue that past research on escalation often failed to establish decision making situations in which escalating decision is clearly economically inadvisable. Since no credible criteria or standards against which to compare the manipulated negative feedback were provided, the subjects in the earlier studies are prone to have difficulties in perceiving the given feedback as truly negative, which makes their decisional choice highly ambiguous. As a result, it is difficult to determine whether the escalation effects reported by previous experiments truly reflect a decisional error or simply indicate a preference for consistency as a way to respond to uncertainty when there is no systematic decision rule. A commonly suggested solution to this methodological deficiency was to provide explicit and relevant prospective information as a decision criterion, which may help decision makers determine the exact nature of the feedback received. Once this correction has been made, researchers found that the strong responsibility effect found in earlier studies either disappears or significantly weakens, which implies that prospective information is more important than either retrospective information or personal responsibility in managers' project evaluation decision.

More recent studies tend to focus on exploring factors that may moderate the level of escalation in various decisional contexts. The main assumption taken by this stream of research is that the escalation phenomenon should be viewed as contingent on a number of factors affecting specific situations. Factors that have been examined as relevant include the magnitude of prior resource commitments (Devigne et al., 2016), the frequency of failures associated with a project (Sarangee et al., 2019; Lant & Hurley, 1999), the availability of decision aids or consultant advices (Ohlert & Weißenberger, 2020; Loh et al., 2019; Behrens & Ernst, 2014), and other relevant personality and psychological variables, such as self-efficacy and anticipated regret (Liang, 2019; Sarangee et al., 2019). All of these variables were found influential in determining a decision maker's commitment level.

As can be seen from the literature review provided above, commitment is a complex process, influenced by multiple and sometimes conflicting factors. As noted earlier, however, there has been no research attempt to understand how the managers' escalating behavior is perceived by performance evaluators who may have an important feedback or learning effect on managers' project-related decisions. Addressing this issue requires a review of the outcome effect literature since the relevant research has shown that evaluators are typically susceptible to the outcome effect.

2.2 Research on the Outcome Effects

The hindsight (or outcome) bias paradigm[2] was established in the probabilistic judgment literature mainly by Fischhoff and his colleagues' contributions (Fischhoff, 1975; Fischhoff & Beyth, 1975;

[2] Previous literature has made a distinction between the effect of outcome knowledge on remembered probabilities and on evaluations. The former is generally called the hindsight bias and the latter the outcome effect (Lipe, 1993).

Slovic & Fischhoff, 1977). Since then, many researchers have attempted to apply the main implications of this paradigm to the evaluative contexts. Such expanded applications were undertaken in a variety of experimental settings (Chen et al., 2021; Mertins et al., 2013). For instance, Mitchell and Kalb (1981) examined the outcome effect on supervisors' evaluations of subordinates in a health care setting. The study found that supervisors with outcome knowledge, especially in the case of a negative outcome, rated the outcome as more probable, held the subordinate more responsible for the outcome, and made more internal attributions for the outcome than did supervisors with no outcome knowledge. In a series of similar experimental studies, Baron and Hershey (1988) provided subjects with a set of 12-16 medical and gambling decisions to evaluate and the outcome of each decision as well. The results showed that the valence of outcome (good or bad) systematically influenced subjects' judgement of the quality of each decision. Similarly, Lipshitz (1989) who employed a military setting to test the outcome effect reported that decision makers and their decisions were perceived more favorably when favorable outcomes were disclosed. Decisions that resulted in a successful outcome were also considered more justifiable and perceived to follow from a superior decision process.

Like these examples, studies that test for the outcome effect in the evaluative context have generally found that the effect is quite pervasive in its occurrence. As a result, research interest in this area has shifted away from whether or not evaluators exhibit the outcome effect, and toward other topics such as identifying the possible causes of the effect and testing various debiasing schemes that are designed to eliminate the outcome effect (Mertins et al., 2013; Peecher & Piercey, 2008). For example, Brown and Solomon (1993) experimentally investigated the viability of three possible competing explanations for the outcome effect: cognitive reconstruction, self-enhancing motive, and an escalation-of-commitment analogue. Their experimental results revealed that the cognitive interpretation provides the most complete account of the outcome effect. They also attempted to attenuate the outcome effect associated with the capital investment decision appraisal, by enhancing the involvement of evaluators in a manager's (i.e., an evaluatee's) decision process. As they predicted, prior advisory involvement was found to be effective in making the manager's decision environment more visible to evaluators, and thereby facilitating their evidence recall (other than the outcome) during the evaluation process. Likewise, Fisher and Selling (1993) observed that an ex ante agreement on outcome prediction between the evaluator and the evaluatee significantly reduced the outcome effect. Other studies also reported several different factors as potential moderating variables. Such variables include mental framing (Jones & Chen, 2005; Lipe, 1993), outcome controllability (Ghosh, 2005; de Villiers, 2002; Tan & Lipe, 1997), decision uncertainty (Peecher & Piercey, 2008; Ghosh & Ray, 2000), the degree of surprise associated with outcomes (Charron & Lowe, 2008) and the type of performance evaluation systems (Mertins, 2010; Frederickson et al., 1999).

Despite these numerous efforts to mitigate the outcome effect on performance evaluation, the general conclusion reached by researchers is that the outcome effect is fairly robust as they found that most debiasing procedures they tested were only marginally successful. The persistence of this outcome effect, therefore, validates the expectation of this study that managers' escalating behavior may be viewed differently depending on how the associated outcomes turn out. In the next section, the effects of escalation of commitment and outcome information on performance evaluation are considered, and testable hypotheses are developed.

2.3 Effects of Escalation of Commitment on Performance Evaluation

In the process of capital investment decisions by which a firm's limited resources are allocated to one decisional alternative over others, it is essential to compare competing projects on the basis of their economic merits. This type of comparative analysis is not necessarily confined to only the initial investment selection stage, but it is also applied to the post investment stage to verify the continued economic viability of the selected projects. For example, the profitability of ongoing projects is often periodically reviewed by comparing their economic performances with certain criteria. Such criteria may include the predetermined hurdle rate (the minimum acceptable return on investment), the profitability of alternative investment opportunities, or the salvage value (the opportunity cost of continuing the current project). Whichever criterion is used, managers' decision whether to continue

or discontinue an existing project typically requires both performance and criterion information. Such information can be either historical (past-oriented) or prospective (future-oriented) in nature. However, it is important to note that the only relevant information in managers' project evaluation decisions is prospective information because their choice should be based on the predicted difference in future performance under each alternative (Horngren et al., 2022). Historical data, such as sunk costs, on the other hand, do not provide any relevant information to the current decision although they may have indirect bearing on the decision by helping in forecasting the future. Critics of past escalation research (Victoravich, 2010; Denison, 2009; He & Mittal, 2007), as already noted in the preceding literature review, clarify this point by arguing that many prior studies failed to provide necessary future information, resulting in highly indeterminable situations where essentially, any decisional choice can be right and wrong. The absence of decision-relevant information also makes it impossible on the part of a performance evaluator to judge the decision quality of a manager without referring to the associated outcome because there are no credible criteria other than outcome available for evaluation.

In order to avoid this problem, the present study employs a life-cycle model of resource allocation based on expected values, which was proposed by Northcraft and Wolf (1984) and adopted by several recent studies on escalation (Liang, 2019; Brüggen & Luft, 2016; Denison, 2009). Northcraft and Wolf suggested that the time-adjusted-rate-of-return be used as a criterion for the allocation of resources to projects throughout their useful lives in situations where calculations of such profitability measures can be realistically made. This approach allows managers to compare the expected rate of return for the remaining life of their projects with that of competing investment alternatives. The major benefit of using this model, therefore, is that it provides managers with explicit decision-relevant prospective information, and thereby clarifies when a financial setback is likely to constitute a rational reason to terminate or abandon their current project. In addition to this conceptual superiority, the use of this model is consistent with the current practice of capital investment appraisal where the adoption of such discounting models has dramatically increased over the years (Horngren et al., 2022).[3]

As described above, if decision information that is both relevant to and necessary for project evaluation is available, decision theories based on the rational choice paradigm assume that a firm's managers will reach decisions that maximize the profitability of their firm. In other words, if managers find that the future performance of their project is not likely to meet certain criteria (e.g., a hurdle rate, the expected ROI of alternative projects, etc.), they are expected to discontinue the project so that its resources can be redirected to a better alternative. However, as evidenced in numerous escalation studies, managers are often overly committed to their projects, and thereby sometimes making a decision which is largely divergent from what normative decision theories suggest. From a viewpoint of performance evaluators, managers' escalating commitment will be perceived dysfunctional only when its associated consequences are expected to be negative. Accordingly, the escalating behavior perceived by evaluators to be undesirable is by nature against a normatively suggested solution. In other words, a decision which does not conform to the normative decision rules, such as the expected return rule discussed above, should be viewed by evaluators as an indication of inappropriate escalation.

Several studies investigated the impact of normativeness of decisions on performance evaluation.[4] For example, Lipshitz (1989) found that those taking normatively appropriate actions were evaluated more favorably than others. Similarly, Mowen and Stone (1992) observed significantly higher performance ratings when a manager's decision matched with expected value calculations. Lipe's (1993) experiment, in which a manager's variance investigation decision was assessed by student subjects, also reported a significant effect for the normativeness of the decision reviewed. Such evidence leads to a prediction that, in the context of this study, managers' escalation

[3] It has been reported that discounted-cash-flow (DCF) models, which explicitly consider the time value of money, are used by more than 85% of the large industrial firms in the US (Horngren *et al*., 2022).

[4] These studies typically use the term, "decision quality," operationalizing it as the congruence of decisions with normative decision models such as the expected value model (Tan & Lipe, 1997).

of commitment to a project which is not recommended by a normative decision model will have a negative impact on performance evaluation. Since the normative decision rule in the current study is based on the expected value of profitability, the normatively correct decision is defined as continuation of a project which has a higher expected profitability and cancellation of a project which has a lower expected profitability than those of alternatives. Accordingly, the prediction proposed above is restated within this study's framework as follows:

H1: Managers who decided to cancel the current project in favor of an alternative project which was expected to be more profitable will be more favorably evaluated than managers who decided to continue the current project.

2.4 Effects of Outcome Information on Performance Evaluation

From the perspective of normative decision theories, the distinction between a good decision and a good outcome is crucial in decision analysis since it is the decision process and not the decision outcome that is a relevant criterion for judging decision quality (Mertins et al., 2013; Ghosh, 2005; Lipshitz & Barak, 1995). Information that can only be available after a decision is made is irrelevant to assessing the quality of that decision. In certain instances, however, outcomes may be valid, although imperfect, inputs to assessments of decision quality (Peecher & Piercey, 2008). Specifically, when a manager has extensive ex ante information (and more information than the evaluator), outcomes can serve as diagnostic cues to the decision process used by the manager since it is reasonable to assume that bad (good) outcomes are more likely to result from poor (good) decisions (Mertins et al., 2013; Tan & Lipe, 1997). If there is no information asymmetry problem, however, the evaluator should only use the information about potential outcomes and the probabilities and utilities of those outcomes that existed at the time of the decision made in assessing the decision quality since the actual outcomes in this case are uninformative (Peecher & Piercey, 2008; Hershey & Baron, 1995).[5] Thus, whether or not it is appropriate to use outcome information in performance appraisals depends on the observability of the manager's decision process and the causal relationship between the decision and its associated outcome (e.g., outcome controllability). For this reason, the effects of outcome information on performance evaluation, unlike in the hindsight bias paradigm in the psychology literature, cannot be unambiguously labeled a bias (Chen et al., 2021; Mertins et al., 2013).

Since a manager's project continuation decision is made ex ante (i.e., before the results of his/her decision are known), the manager should be evaluated based on the ex ante information if that information is shared by the manager and the evaluator. Research on the outcome effect, however, has shown that ex post information also affects performance evaluation even when the available outcome information cannot be indicative of the decision quality. For instance, Baron and Hershey (1988) allowed their student subjects to have all the relevant information known to the decision maker, plus the outcome knowledge. Nevertheless, the students still appeared to take their outcome knowledge into account in rating the quality of the decision they reviewed. Likewise, Fisher and Selling (1993) investigated whether the outcome effect can be eliminated when the decision process used by an evaluatee is observable to evaluators. Their experiment results showed that the outcome effect still existed even under conditions of perfect knowledge of the decision process algorithm. They conjectured that the reason of failure in complete elimination of the outcome effect by the observability might be due to the absence or inadequacy of knowledge about the optimal transformation process of information into the decision. This uncertainty as to what is the definitely appropriate decision may have caused evaluators to still rely on the outcome information even though they had the perfect knowledge of the decision process.

Based on the theoretical discussion and the existing empirical evidence provided above, it is predicted that evaluators of this study will also consider the ex post outcome information (i.e., the degree of success in the chosen project), as well as the ex ante forecasted profitability data which

[5] This discussion is consistent with the agency theory perspective (Holmstrom, 1979). That is, when the agent's effort is observable, the first best solution is to reward the agent based upon those efforts. On the other hand, if the agent's effort is either unobservable or imperfectly observable, the best solution is to reward the agent upon outcomes alone or some combination of outcomes and information that is incrementally revealing of effort.

were used by managers to make their project continuation decisions. As a result, when the outcome turns out successful, the manager's decision may appear more appropriate ex post, and thereby leading to a higher performance rating than when the outcome turns out unsuccessful. The following hypothesis formulates this prediction:

H2: Managers who chose a project that turns out to be successful will be more favorably evaluated than managers who chose a project that turns out to be unsuccessful.

2.5 Interactive Effects of Escalation of Commitment and Outcome Information

Another noteworthy finding of prior outcome effect research is that the valence of outcome (whether it is positive or negative) may have differential impacts on evaluators' cognitive efforts in their assessment task (Mertins et al., 2013). In general, research found that negative information is more heavily weighted than positive information in performance evaluation. For example, Mitchell and Kalb (1981) found that a poorly performing subordinate is blamed more harshly when the resulting outcome is negative than when it is positive. In the context of audit litigation, Peecher & Piercey (2008) observed that the possession of adverse outcome information by evaluators leads to harsher judgements of auditor negligence. Similarly, Tan and Lipe (1997) investigated whether the performance evaluation is affected by the outcome controllability by managers, and reported that their predicted relationships are found only under the negative outcome condition. That is, with a failed outcome, the performance evaluation varied depending on whether the outcome was controllable or uncontrollable by managers, whereas with a successful outcome, there was no such variation. They explained this conditional effect of controllability by referring to the salience of negative outcomes in performance evaluation. It was speculated that the justification or consideration of reasons as to why a particular outcome occurred may become more important when the outcome is negative than when it is positive. Accordingly, under the circumstance where justifications are more essential for poor outcomes, it is natural for evaluators to perform more intensive decision analysis when outcomes are negative than when they are positive.

Some prior research provides support for this idea. In a study of corporate annual reports' letter to shareholders, Bettman and Weitz (1983) found that more detailed causal analysis is provided for unfavorable than favorable company performance. Wong and Weiner (1981) reported that spontaneous attributional thinking is more prevalent in the face of negative outcomes than for positive outcomes. Empirical evidence like this has an implication for the current study as it suggests that a negative outcome may lead to a more engaged and careful analysis of causes for the outcome. In the context of this study, the valence of a project outcome (either successful or unsuccessful) could make evaluators take very different attitudes in analyzing the manager's decision process. In other words, evaluators told of an unsuccessful outcome may exert greater cognitive efforts to analyze the manager's decision process, whereas those told of a successful outcome may either put inadequate efforts into their analysis or become less sensitive to the quality of the decision made. Accordingly, it is expected that the distinction made by evaluators between the good (non-escalating) and bad (escalating) decisions will be more significant under the condition of an unsuccessful outcome than under the condition of a successful outcome. The following interaction hypothesis formulates this expectation:

H3: There will be a greater difference between the performance evaluations of escalating managers and non-escalating managers when the project outcome is unsuccessful than when it is successful.

3. Method

3.1 Participants

A behavioral decision-making experiment was conducted to examine the hypothesized relationships. Participants were 128 MBA students enrolled in an advanced managerial accounting course at a large public university (61 females and 67 males). The typical subject was about 27 years old and had 4-5 years of work experience. All of the participants provided usable responses. The questionnaires were

distributed and returned during a regular class session, taking about 30 minutes for their completion. Participation was voluntary and consent was obtained. A small amount of course credit was offered to encourage participation, and participants were assured that their responses were confidential and anonymous. Since most participants either had just completed or were currently taking courses in which the basic knowledge and skills for various types of decision-making in business are taught (e.g., economics, finance and managerial accounting), they appeared to be academically prepared for the current study's experimental task.

3.2 Experimental Task

The participants were projected into the role of a senior manager who has been asked to evaluate the decision-making performance of a hypothetical junior project manager.[6] It was described in the case scenario (see Appendix) that Patrick, the hypothetical junior project manager, who possessed independent decision-making authority for his project selection and management, currently launched his third project (Project Q) after successful completion of the initial two projects that he had initiated and managed. The new project had an expected lifetime of five years and its overall expected net present value was estimated as $7,000,000 at that time. After 3 years, however, the project was behind schedule with cash flows about 50% less than originally forecasted. Accordingly, he reevaluated his project's future prospect to decide whether the project should be continued for the remaining two years of its lifetime, or terminated early so its resources could be used for another project (Project Z) which had the same years of expected lifetime as the remaining period of the current project. The explicit future performance data associated with these two alternative projects were available for his project continuation decision as presented in Table 1.

Table 1. Expected Future Performance Information of the Projects

Project Q **(Current Project):** Expected net present value for the remaining two years:

20% chance of a net present value of $6,000,000; .20 × $6,000,000 = $1,200,000
80% chance of a net present value of $3,000,000; .80 × $3,000,000 = $2,400,000
Expected net present value …… **$3,600,000**

Project Z **(Alternative Project):** Expected overall net present value for its two year lifetime:

50% chance of a net present value of $5,000,000; .50 × $5,000,000 = $2,500,000
50% chance of a net present value of $4,000,000; .50 × $4,000,000 = $2,000,000
Expected net present value …… **$4,500,000**

As shown in the table, since the expected net present value of the current project for the remaining two years of its lifespan is less than the expected net present value of the alternative project during the same period, a normatively correct decision is to discontinue the current project and transfer its resources to the alternative project. Thus, if Patrick is persistent in continuing his current project despite its lower profitability projected, this should be viewed as an indication of escalating

[6] The selection of a junior project manager as an evaluatee was intended to provide the participants with an implication that this type of managers may have a stronger incentive to escalate their commitment even in a failing project. Prior research (Harrell & Harrison, 1994) indicates that a junior project manager with a growing reputation for successfully managing projects (like Patrick in this study's case scenario) could be more vulnerable to the sunk cost or escalation effects than a senior project manager with a relatively solid reputation gained over a period of years. This is because the relative impacts of their performances in a single project (particularly when it was unsuccessful) on their reputation, job security and/or marketability would be much different between the junior and senior project managers. To make this point clearer to the participants, it was stated that generally, managers gain a reputation as being talented when their managed projects are successful while unsuccessful project can damage their reputation and career potential.

his commitment in the failing project.

After reading the case scenario described above, the participants received information about what decision Patrick eventually made and how the subsequent outcome related to his decision turned out. The participants then were asked to evaluate his decision performance. The response was elicited on a Likert-type scale that ranged from 1 to 10 in which the end points were labeled "unsatisfactory decision-making performance" and "satisfactory decision-making performance," respectively.[7] Accordingly, larger numerical responses indicate more positive performance evaluation.

3.3 Research Design

The study employed a 2 × 2 between-groups factorial design as depicted in Table 2. The two independent variables are escalation of commitment (yes/no) and project outcome (good/bad). The participants were randomly assigned to one of the four experimental groups. The escalation of commitment was manipulated at two levels by informing the participants that the project manager (Patrick) decided to either continue (escalating) or discontinue (non-escalating) a project which was not recommended by the normative decision rule (i.e., the expected net present value approach). Similarly, the project outcome was manipulated at two levels by providing the participants with the actual performance information about the project chosen, as either better (successful) or worse (unsuccessful) than was originally estimated.

Table 2. Research Design Used in the Experiment*

Project Outcome***	Escalation of Commitment**	
	Yes	No
Good	***Group 1*** (n = 30)	***Group 2*** (n = 31)
Bad	***Group 3*** (n = 29)	***Group 4*** (n = 27)

* Dependent variable: evaluations of the decision performance of a hypothetical project manager (1 = Unsatisfactory; 10 = Satisfactory)

** Escalation of commitment was manipulated at two levels by informing that the hypothetical project manager decided to either continue (Yes) or discontinue (No) a project which was not recommended by the expected net present value approach.

*** Project outcome was manipulated at two levels by informing that the actual performance of the project chosen by the hypothetical project manager was either better (Good) or worse (Bad) than was originally estimated.

Two manipulation check questions were used to assess how well the participants understood the specific treatments given to them. For the escalation of commitment treatment, the manipulation question asked them to answer whether the project manager decided to continue his project in the case scenario they just reviewed. A 9-point response scale was used to measure the degree of participants' agreements with this statement so that larger numbers indicated stronger agreements while smaller numbers stronger disagreement with the statement. For the project outcome treatment,

[7] In order to minimize the centralizing tendency of responses which often occurs when there is overly strong wording such as "definitely" or "extremely", the end points were labeled using relatively mild words.

it was asked whether the eventual outcome of the manager's chosen project was successful. The same response scale described above was used to measure the agreements with this second manipulation check statement. Lastly, the participants were asked to provide some demographic information such as gender, age, education level, and work experience.

4. Analysis and Result

4.1 Preliminary Analyses

Prior to hypothesis testing, various preliminary analyses were performed to assure the effectiveness of the randomization process and the satisfaction of model requirements. The chi-square test results indicated that the participants' gender and education level were not significantly different across the four experimental groups ($\chi2 = 0.89$, $p = 0.83$ and $\chi2 = 10.80$, $p = 0.29$, respectively). The results of ANOVA which was performed for the other quantitative demographic variables (age and work experience) also indicated no significant differences for these variables among groups ($F = 0.28$, $p = 0.84$ and $F = 1.04$, $p = 0.38$, respectively). Thus, the randomization procedure appeared to be successful. In addition, no systematic relationships were found between the demographic variables and the participants' responses, from a regression analysis in which all demographic variables listed above were incorporated as independent variables together with the two experimental factors. Accordingly, differences in demographic variables do not appear to influence the results of this study. Other univariate tests performed on the response variable suggested that the basic assumptions for the analysis of variance (e.g., normality, equal variances) were reasonably well met by the data.

An examination of the manipulation check data revealed that the manipulation of this study was successful. As expected, the mean response in the escalation condition (7.7) was significantly larger than the mean response in the non-escalation condition (2.3) for the first manipulation check question which asked how strongly the participants agreed with the statement that the project manager decided to continue his current project ($t = 22.33$, $p < .0001$). Similarly, for the outcome manipulation check question in which the participants were asked whether the actual outcome information they received indicated success, a significantly greater mean agreement was found for the good outcome condition (7.9) than for the bad outcome condition (2.4) as intended ($t = 24.55$, $p < .0001$). Since eleven of the 128 participants (about 9%) made obviously wrong answers to one or both of the manipulation check questions, the 3-step ANOVA procedure previously used by Harrell and Harrison (1994) was employed to determine whether these participants' incorrect answers on the manipulation check influenced their evaluation responses.[8] While there was no evidence of such influences, it was decided to include only those participants who passed the manipulation check (117 respondents) for hypothesis testing. The study results, however, remained unchanged when the analyses described below were performed with all 128 participants.

4.2 Hypothesis Testing

A 2 × 2 analysis of variance (ANOVA) was conducted to test the hypotheses. Table 3 summarizes the results of this analysis. As shown in Panel A of this table, the overall model is statistically significant ($F = 32.74$, $p < .0001$). The results also indicate significant main effects for both escalation of commitment ($F = 28.36$, $p < .0001$) and project outcome ($F = 59.62$, $p < .0001$). Of more importance to this study is that the interaction between these two variables was also found significant ($F = 8.88$, $p = 0.0035$), as will be explained in greater detail below. The omega-square statistics (ω^2), which measure the relative impact size of each variable, indicate that the outcome effect (28%) dominates the escalation effect (13%) and its interactive effect with escalation (4%) on participants' evaluation responses, which is similar to the typical findings of prior outcome effect research (e.g., Ghosh & Ray, 2000; Tan & Lipe, 1997; Lipshitz, 1989).

[8] This procedure incorporates in an ANOVA model a categorical variable which indicates whether the participants' manipulation check responses were correct or incorrect. In the first step, this manipulation check variable is added as a main effect. Next, if it is not found significant, an interaction term between this variable and one of the experimental variables replace the main effect term. This process continues until all possible interactions are tested.

Table 3. Results of Hypothesis Testing (N = 117)

Panel A: Results of Analysis of Variance*

Source	F	p-value	ω^2
Model	32.74	< .0001	
Escalation of Commitment (E)	28.36	< .0001	0.13
Project Outcome (O)	59.62	< .0001	0.28
Interaction (E × O)	8.88	.0035	0.04

Panel B: Mean Performance Evaluation by Groups (standard deviations in parentheses)

Project Outcome***	Escalation of Commitment**		Overall
	Yes	No	
Good	***Group 1*** 6.83 (1.46) *n* = 30	***Group 2*** 7.61 (2.19) *n* = 31	7.23 (1.89) *n* = 61
Bad	***Group 3*** 3.28 (1.67) *n* = 29	***Group 4*** 6.04 (1.76) *n* = 27	4.61 (2.20) *n* = 56
Overall	5.09 (2.37) *n* = 59	6.88 (2.14) *n* = 58	6.07 (2.45) *N* = 117

Panel C: Planned Comparisons

	t	*p*-value
Escalation *vs.* no escalation decisions under good outcome:		
(Group 1 vs. Group 2)	1.64	0.107
Escalation *vs.* no escalation decisions under bad outcome:		
(Group 3 vs. Group 4)	6.02	< 0.001

* Dependent variable: evaluations of the decision performance of a hypothetical project manager (1 = Unsatisfactory; 10 = Satisfactory)

** Escalation of commitment was manipulated at two levels by informing that the hypothetical project manager decided to either continue (Yes) or discontinue (No) a project which was not recommended by the expected net present value approach.

*** Project outcome was manipulated at two levels by informing that the actual performance of the project chosen by the hypothetical project manager was either better (Good) or worse (Bad) than was originally estimated.

Further analyses were proceeded to examine the nature of the observed main effects as well as interaction effects. Panel B contains the mean level of performance ratings given by participants in each experimental group. As shown in the table, the significant differences are in the predicted directions.

Specifically, the participants evaluated the manager's decision performance more positively when the manager discarded his current project in favor of the alternative project which was

recommended as a better option by the expected return rule (M = 6.88) than when he was continuously committed in his current project (M = 5.09). These results are consistent with the first hypothesis predicting that the performance evaluation of managers will be affected by the normativeness of decision-making reflected in their project continuation decisions. Accordingly, H1 was supported. Similarly, the mean performance evaluation was significantly higher when the project outcome was reported as successful (M = 7.23) than when it was reported as unsuccessful (M = 4.61). This is consistent with the second hypothesis predicting that the performance evaluation of managers will be influenced by the outcome information as well. Thus, H2 was also supported.

In terms of extremes within the four groups, Group 2 (no escalation/good outcome) provided the highest level of performance rating (M = 7.61) and Group 3 (escalation/bad outcome) reported the lowest level of performance rating (M = 3.28) as expected. However, it is important to note that only this group (Group 3) among the four groups indicated virtually negative performance evaluation.[9] In fact, the mean performance evaluation of Group 1 (escalation/good outcome, M = 6.83) is positive and in the second highest position although this group, like Group 3, was informed that the manager escalated his commitment in a less profitable project (i.e., a rationally incorrect choice against the normative decision model). Thus, the manager assessed by this group was actually praised rather than blamed for his undesirable escalating behavior because of the successful outcome. On the other hand, the mean performance rating given to the manager of Group 4 (no escalation/bad outcome, M= 6.04) does not indicate a clearly favorable level of assessment even though he made a rationally correct choice based on the normative decision rule.[10] Instead, the manager of this group who made a right decision (no escalation) but unfortunately experienced a bad outcome was actually less favorably evaluated than the manager of Group 1 who made a wrong decision (escalation) but luckily obtained a good outcome.[11] This implies that the participants in the present study were unable to ignore ex post outcome information, which was not available at the time of project managers' decision, but in fact more heavily utilized this information in their assessment task than they used the escalation information.

H3 predicted that there would be a greater negative effect of escalation of commitment on performance evaluations by respondents under the bad outcome condition than under the good outcome condition, implying a significant interaction between the escalation and outcome factors. Since this interaction turned out significant (F = 8.88, p = 0.0035) as shown in Panel A of Table 3, additional analyses were carried out to clarify the nature of the interaction effect found. Panel C of Table 3 reports the results of planned comparisons for testing the third hypothesis. As displayed in the table, when the reported project outcome was successful, there was no significant difference between the performance rating on the escalating manager and on the non-escalating manager (t = 1.64, p = 0.107). In contrast, when the reported project outcome was unsuccessful, there was a significant difference in evaluating the escalating manager and the non-escalating manager (t = 6.02, p < 0.001). Accordingly, the significant main effect observed for escalation in the ANOVA model appears to be mostly due to the difference found in the bad outcome condition. The results of these pairwise comparisons therefore suggest that the participants were more vigilant in discerning the manager's decision quality when the outcome was unsuccessful than when it was successful, as implied in H3.

5. Discussion

Before discussing the results of this study and their implications, some limitations and strengths of this study should be noted. One limitation is that the participants were all students with, perhaps, no or little prior experience or formal training in doing performance ratings. Experienced managers or

[9] The mean performance evaluation of this group (3.28) was significantly lower than the neutral point of 5.5 ($t = 7.19$, $p < 0.001$).

[10] The mean performance evaluation of this group (6.04) was not significantly different from the uncertain value of 5.5 ($t = 1.58$, $p = 0.126$).

[11] The mean performance evaluation of this group (6.04) was significantly lower than the mean evaluation of Group 1 (6.83) at the 10% significance level ($t = 1.86$, $p = 0.068$).

practitioners in the field may have reacted differently to the performance data presented in the current experiment. Accordingly, the study needs to be expanded using participants with professional experience in performance evaluation to see if the findings of this study are replicable. In addition, other evaluation-relevant information (e.g., manager's past performance history) which is perhaps available in a more realistic case was not considered in this study for the purpose of simplicity. The inclusion of this additional relevant information, however, could have produced different results. Accordingly, caution must be taken in extending the results of this study to other groups or settings. A strength of this study is that it employed an experimental research design that is generally considered to have the highest level of internal validity required to establish stronger causal relationships among the variables of interest.

The present study investigated how a project manager's escalation of commitment in a failing project is perceived by evaluators when the eventual outcome is already known. Since a manager's escalating behavior which is not in accordance with a normatively appropriate action should be viewed as dysfunctional, it was hypothesized that the escalation of commitment by a manager will have a negative impact on performance evaluation if the manager's decision process is observable (H1). In addition, since manager's escalating decision may produce a favorable outcome (though less likely) as well as an unfavorable outcome and the evaluators are typically vulnerable to the outcome effect, it was hypothesized that the project outcome information will also affect performance ratings by evaluators (H2). Finally, the salience of negative outcomes in performance appraisal, which was often observed in prior research, resulted in an additional hypothesis that the outcome information will have differential impacts on the evaluators' decision analysis (H3).

The experimental results of this study provided strong support for both the main effect hypotheses (H1 and H2) and the interaction hypothesis (H3). As predicted, a manager who displayed normatively irrational behavior in his project continuation decision (the escalating manager) was less favorably evaluated than a manager who abstained from such behavior (the non-escalating manager). Additionally, the results show that evaluation by outcomes is also evident in the context of evaluating escalating managers. An identical decision was appraised differently depending on its resultant outcome. When the manager decided to continue his commitment in a less profitable project and the subsequent outcome was successful, the manager was in fact praised for his escalating behavior, while the same behavior was criticized, as it ought to be, when the outcome was unsuccessful. These results empower Staw's conjecture (1981) that the escalation phenomenon may represent a post-hoc reconstruction of events by observers. Finally, the results of planned pairwise comparisons suggest that the salience of negative outcomes may have triggered and intensified evaluators' decision analysis efforts in their evaluation process.

The results of this study have implications for both practice and research. From the practical standpoint, the study has implications for the design of systems used to evaluate managers' decision performance. In the present study, ex ante decision relevant information available for a manager' project continuation decision was fully conveyed to the evaluators, and communicating such information did influence their evaluation process. However, as can be seen from the effect size analysis in the results section, the outcome effect was so dominant that most participants did not adequately consider the decision quality information which is more important than the outcome information from the normative perspective and so should be more heavily weighted in their evaluation task. Thus, simply supplying information regarding managers' decision process may not necessarily insure against reaction to the outcome information. This implies that outcome effects may be best dealt with through the design of better performance evaluation systems. The systems may be designed by management, intentionally or unintentionally, such that either decision process quality or outcome valence is the major basis for appraisal. The results of this study suggest that a major emphasis be placed on the decision process and its judgmental criteria (e.g., formal decision rules based on professional experience or expertise, standard operating procedures, etc.) to avoid potentially detrimental consequences from both escalation and outcome effects.

The study also has implications for research examining the effect of feedback on learning. Given that performance evaluation in an organization can be a learning mechanism, ill-structured evaluation

systems may restrict managers' abilities to learn from experience (Brown & Solomon, 1993). If evaluators were subject to outcome effects when evaluating the decisions made by managers, over time such effects could shift the managers' attention away from rational and prospective decision-making and toward risky and persistent commitment to their past decision. For instance, if project managers learn by experience that their performance will be assessed mainly based on outcomes rather than their decision quality and that neither project audits nor information gathering by their company will be undertaken until the completion of the project they initiated, managers are more likely and more frequently to escalate their commitment. The management should consider this issue when designing their evaluation systems.

Further research is needed to determine whether the findings from this study can be generalizable to other contexts than the specific one studied here. There are a wide range of investment situations where the escalation of commitment by actors and the outcome-based evaluation by observers may interplay to preclude optimal investment choices and effective organizational learning. Among those potential research contexts, it is of particular interest to examine an investment setting in which clear prescriptive decision rules or feedback may not be readily available, such as a research and development funding case. Also, prior research indicates that subjective performance evaluation like the one used in this study may be influenced by a variety of personality and organizational variables, such as risk propensity, uncertainty avoidance, locus of control, interpersonal similarity, budgetary participation, and incentive structure. Thus, future research could examine the role of these additional factors in performance evaluation along with the information about managers' decision process.

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Appendix: Case Materials

Project Management Case
(Yes-Escalation / Good-Outcome Condition)

As a senior manager of Harvest Project, Inc., you supervise Patrick Lopez, who is a junior project manager. Patrick is employed at another location and you cannot directly observe his work activities. Your company uses a highly decentralized management approach that provides each project manager with a high level of independent decision-making authority. When the projects they initiate and manage are successful, project managers gain a reputation as being talented. When project managers initiate and manage a project that fails, this can damage their reputation and career potential. The initial two projects that Patrick initiated and managed were successful. Project Q, the third project that Patrick initiated and currently manages, has an expected lifetime of five years. Initially, there was a 75% chance Project Q would provide a net present value of $8,000,000 and a 25% chance it would provide a net present value of $4,000,000. Thus Project Q had an overall expected net present value of $7,000,000 (.75 × $8,000,000 = $6,000,000; .25 × $4,000,000 = 1,000,000; $6,000,000 + $1,000,000 = $7,000,000). After three years, Project Q has fallen significantly behind schedule with cash flows that were about 50% less than originally estimated. ***At this point, Patrick evaluated Project Q's future expectations to decide whether Project Q should be continued for the remaining two years of its lifetime, or cancelled so its resources could be used for an alternative project, Project Z.*** Project Z had an expected lifetime of two years and would provide benefits similar to those provided by Project Q. The expected net present value approach is usually used for such decisions in the Company. The two projects are described below.

Project Q**:** Expected net present value for the remaining two years:

20% chance of a net present value of $6,000,000; .20 × $6,000,000 = $1,200,000
80% chance of a net present value of $3,000,000; .80 × $3,000,000 = $2,400,000
Expected net present value …… **$3,600,000**

Project Z**:** Expected overall net present value for its two year lifetime:

50% chance of a net present value of $5,000,000; .50 × $5,000,000 = $2,500,000
50% chance of a net present value of $4,000,000; .50 × $4,000,000 = $2,000,000
Expected net present value …… **$4,500,000**

Patrick has independent decision-making authority for this decision. He was, however, required to either (1) continue Project Q or (2) cancel Project Q and use its resources for Project Z. Patrick believed that he could make Project Q successful, so ***he decided to continue Project Q***.

After Project Q's completion, an internal project audit revealed the results for the last two years of its lifetime. During this time period, Project Q's results were ***better*** than was predicted for either Project Q or Project Z. Project Q was, therefore, a ***successful*** project.

As Patrick's supervisor, you are required to provide an evaluation of his managerial **decision-making performance**. Project Q was the only project Patrick managed during this period. Circle a number below to indicate your evaluation.

Unsatisfactory Decision-Making Performance									**Satisfactory Decision-Making Performance**
1	2	3	4	5	6	7	8	9	10

DO NOT LOOK BACK OR CHANGE YOUR PREVIOUS RESPONSE WHILE COMPLETING THIS PAGE!

I. Respond to the following two questions based on the information presented to you in the case you just completed.

1. When Patrick was required to choose between the two projects, Projects Q and Z, he believed that he could make ***Project Q*** successful, so he decided to ***continue Project Q***.

1	2	3	4	5	6	7	8	9
Strongly Disagree								Strongly Agree

2. After Patrick completed the project that he had chosen, an internal project audit revealed that the actual results of his chosen project were ***better*** than was predicted for either Project Q or Project Z. Thus, the project that he had chosen was a ***successful*** project.

1	2	3	4	5	6	7	8	9
Strongly Disagree								Strongly Agree

II. Participant Information

Please provide the following information about yourself. As mentioned earlier, your replies are not associated with your name; so all replies are completely anonymous.

1. Gender: Male_____ Female_____

2. Age: _____

3. Education level:

Ph.D. or equivalent_____ Masters Degree (in progress)_____

Bachelors Degree (in progress)_____ Other (specify)_____

4. Number of years of work experience (if any)_____

5. Number of years of manufacturing experience (if any)_____

6. Number of individuals you have ever supervised (if any)_____

7. Total approximate annual compensation (if any)_____

THANK YOU VERY MUCH FOR YOUR PARTICIPATION.