



# **Escalation of commitment: evaluating project termination behaviour of masters of engineering management students**

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## **Abstract**

In this study we presented 180 Masters of Engineering Management students with five scenarios of a troubled project at different phases in the project lifecycle. Each scenario presented specific economic parameters about the return on investment if the project is completed, and the salvage value should the project be stopped before completion.

The research showed that, despite their project management education, the students exhibited substantial escalation of commitment behaviour, and the majority chose to continue with the project in the face of clear evidence that the project would fail.

## **Key phrases**

*decision making, escalation of commitment, project management, project termination, masters of engineering management (MEM)*

## 1. INTRODUCTION

### 1.1 Background

From a managerial perspective, one of the hardest choices that one could be faced with is the decision to continue or abandon a project that is not performing as planned (Keil, Mann & Rai 2000:632). Such projects usually require additional resources, in the form of funding, to secure resources in an attempt to save the endeavour. Escalation of commitment studies the phenomenon where decision makers do not terminate a failing project, but continue investing in an attempt to recover their losses.

The objective of this research is to evaluate the effect of predefined determinants on the decisions of Masters of Engineering Management (MEM) students to escalate commitment in an experimental study. In the study, five different project scenarios were presented related to five different phases of the project lifecycle, each with its own specific return on investment if the project is completed, and a salvage value if the project is stopped. It is assumed that the project manager is the primary decision maker in the experiment, and is therefore responsible for escalating commitment, should it occur.

### 1.2. Historical development of research on escalation of commitment

Escalation of commitment has been studied by many authors over the past 40 years, most of whom refer to the benchmark study by Barry Staw (Staw 1976:27) in their studies and definitions. The phenomenon of *escalation of commitment* (EoC) deals with instances where people assign additional resources towards causes which appear to be failing (Staw 1976:28). Brockner (1992:41) and Staw (1997:192) later revised the definition. They concluded that EoC takes place when the parties who are responsible for making the decision on whether or not to advance a project, keep committing resources, even though it is clear that the resources already committed to the cause had no effect on the outcome.

During the 1980s and 1990s most EoC research was specifically aimed at individuals, but some studies started to include organisational escalation behaviour (Ross & Staw 1993:724). In early research many experiments were conducted which confirmed the tendency of individuals to escalate commitment (Brockner & Rubin 2012:51; Staw 1976:30; Teger 2013:13).

EoC in the traditional project industries such as construction, information technology, research and development, utilities, manufacturing, telecommunications, and education have been studied extensively (Kloppenborg & Opfer 2002:53). Industry-specific EoC studies include information technology (Chulkov & Desai 2008:325; Jani 2011:935; Keil 1995:421; Keil *et al.* 2000:633; Keil, Rai, Mann & Zhang 2003:254; Mähring, Holmström, Keil & Montealegre 2004:215; Mähring & Keil 2008:239; Smith, Mark Keil & Depledge 2001:192; Tan, Smith, Keil & Montealegre 2003:67), sports and expeditions (Alvarez, Pustina & Hällgren 2011:971; Staw & Hoang 1995:476), management sciences (Bowen 1987:53; Brockner 1992:43; Chulkov & Desai 2005:138; DeMarco 1986:114; Desai & Chulkov 2009:32; Miller, Droge & Vickery 1997:149; Ross & Staw 1993:705; Zmud 1980:47) accounting (Denison 2009:138; Harrell & Harrison 1994:570; Rutledge & Karim 1999:179; Schulz & Cheng 2002:80), and psychology (Garland 1990:729).

Since the mid-1970's, a number of explanations for EoC have been proposed from research studies in various settings, such as case studies, experiments, data surveys, and analysis of previous research. From this research, a number of models were developed to explain EoC behaviour in project decision making. The most recognised model was developed by Staw (1997:207), while Mähring and Keil (2008:255) proposed a process model for EoC through their observations, specifically in information technology. These models attempt to explain the processes of decision making in escalation situations.

### **1.3 Research problem**

Various researchers have conducted studies in experimental settings as well as field investigations and have derived different explanations for the phenomenon of EoC. In this research study, we investigate whether previous experience and training, specifically in project management, influence the outcome of EoC decisions.

It is expected that this study will show specific variations in the experimental results compared to that of previous research, given that the respondents in this study are students in the post-graduate management sciences. It is expected that their decisions to stop or continue a troubled project will be affected by their past education and work experience. In this context, a troubled project has clear indications that it will not deliver the expected business benefits to the organisation.

All the respondents in this study have a 4-year engineering qualification and at least 3 years of work experience. This study relates the decisions of the respondents to specific EoC theories and determinants, as described in the literature review, and the effect of these determinants on the decision makers is analysed and discussed.

#### **1.4. Rationale for the study**

It is known that all the respondents for this study have a minimum level of education and work experience. The following additional information about the respondents was collected during the experiment:

- The number of employees in their organisation;
- Their current involvement in the selection of projects;
- The number of years they have been in a decision making position;
- The typical duration of projects in their organisations; and
- The typical value of projects performed in their organisations.

It is proposed that, given their past experience, the respondents in this study would make better-informed decisions in the experimental setting.

In addition to their formal qualification, all the MEM students have received training on the Guide to the Project Management Body of Knowledge (PMBOK® Guide) published by the Project Management Institute (2013:47-63) which is a globally recognised standard for project management.

This training introduced the respondents to the end-to-end project management lifecycle and specific project management concepts, such as project feasibility and justification, strategic alignment, benefits realisation, project scope, time, cost, and risk.

From this training, it is established that a minimum but sufficient level of project management education exists, and that respondents understand the impact of their decisions to continue or stop a project. This study is compared to a previous study by Meyer (2013:288), based on the same experiment, and therefore adds to the current literature on EoC, but specifically focussed on project management education.

## 1.5. Research objectives and research questions

The objective of this research is to determine if the decision of MEM students to stop or continue a failing project is affected by specific EoC determinants and the demographic factors of the students.

This study aims to answer four research questions:

1. Do MEM students exhibit the typical behaviour as determined and described in previous research on the theory of Escalation of Commitment?
2. Are certain predefined determinants (self-justification, project completion, optimism bias, sunk cost, and economical and technical side bets) more supported by the MEM students during the decision making process?
3. Are certain predefined determinants (self-justification, project completion, optimism bias, sunk cost, and economical and technical side bets) more supported by the MEM students compared to previous research by Meyer (2013:288)?
4. Is there a difference in MEM students' decision to continue a project when considering the main demographic data, compared to previous research?

## 2. THEORETICAL BACKGROUND

### 2.1 Theory and research review

Existing literature on project failure suggests that projects end up in failure as a result of cumulative smaller problems encountered throughout the project lifecycle. The return on investment of the failed projects usually deteriorated over a period of time until it was completely eroded, as opposed to an instantaneous collapse of the return on investment. The impact of this slow incremental deterioration is that projects are likely to consume more resources than initially planned over a period of time (Keil 1995:435; Ross & Staw 1986:275; Ross & Staw 1993:702).

One of the earliest EoC studies is that of Staw (1976:39) who concluded that, although one would expect people not to invest in causes that have led to negative consequences, people may actually increase their commitment of resources and effectively face further negative consequences. A further study by Staw (1981:578) proposes that the difficulty decision

makers face is not limited to isolated instances, but is often related to the effect their choice will have on an entire course of action. In project management this is especially true since an isolated choice can have many repercussions on the interrelated and interdependent parts of the project.

Bazerman, Giuliano and Appelman (1984:147) explored the EoC phenomenon in individual and group decision making. They proposed that cognitive dissonance is often the mediator in EoC. They found that, in an attempt to justify their previous decisions, decision makers escalate their commitment towards the failing course. This is similar to the self-justification theory (Staw 1976:27). Further to the aforementioned, it was indicated that a decision maker with a higher sense of responsibility will make greater commitments or investments in an attempt to save the project.

Prior to the study by McCain (1986:280), research focussed on the way in which decision makers respond to negative feedback or so-called failures. A laboratory study about the limits of escalation suggested that commitment to financial investment towards these failing causes are related to two very distinct stages i.e., escalation followed by de-escalation (McCain 1986:281). The findings by McCain (1986:283) are consistent with those of Staw and Fox (1977:446) who suggest that escalation decreases when a decision maker is given the choice of alternative investments.

Bowen (1987:54) explains EoC as a process of becoming entrapped in a cycle of commitment to a failing course as a result of difficult decisions and not due to a behavioural inclination. He proposes the theory of decision dilemmas, which suggests that the psychological forces driving EoC are the result of decision errors, since EoC is the result of decisions.

EoC studies in information technology are quite common, as managers often continue with failing projects (Jani 2011:937). The information technology industry is the source of a large proportion of the EoC literature (Jani 2011:935; Keil 1995:421; Keil *et al.* 2003:253; Mähring *et al.* 2004:215; Mähring & Keil 2008:242; Smith *et al.* 2001:193; Tan *et al.* 2003:66).

The inability to accurately identify risks involved with information technology projects is a main contributing factor which results in many projects failing. This led to various studies that focused on identifying and classifying risks that could result in complete project failure (Barki, Rivard & Talbot 1993:217; Boehm 1991:37; Jani 2011:936).

Accounting literature describes decision makers who escalate commitment to resources in capital investment decisions (Denison 2009:133; Harrell & Harrison 1994:569; Rutledge & Karim 1999:179; Schulz & Cheng 2002:78). In past accounting research, the respondents were not required to calculate the value of capital budgeting projects such as net present value or internal rate of return, although these parameters are widely associated with making capital investment decisions (Denison 2009:135). The argument from Denison (2009:148) is that decision makers who are given the value of real options base their decisions on better quality information, which leads to better investment decisions and less EoC.

Mähring *et al.* (2004:212) criticized studies related to EoC for focussing on the determinants of commitment instead of the underlying decision making process. The study by Alvarez *et al.* (2011:979) contributed to literature by shifting the focus towards a decision process view, and re-orientated project management studies with process studies. Their study focussed on the non-traditional study area of mountaineering, specifically the 1996 Mt Everest disaster. Their process analysis pointed out that escalating commitment could be understood as sequential, parallel, and loosely coupled sub-processes, all intersecting a common goal (Alvarez *et al.* 2011:972).

It should also be noted that EoC is not always an incorrect course of action and there may be very good reasons for organisations to continue with a project to reap long-term benefits. Staying the course requires careful investigation of the lifecycle cost of a project to determine the potential benefits that the project may bring (Drummond 2014:441).

## 2.2 Escalation of commitment theories

Following is a brief summary of the theories that are investigated in this research study:

**Self-justification** occurs when a person encounters cognitive dissonance, or when a person's behaviour is different from what they truly believe, but they justify their decisions or actions despite the negative feedback they receive (Staw 1976:27; Steinkühler, Mahlendorf & Brettel 2014:191).

**Sunk Cost Theory** describes decision makers' inclination to continue committing resources to a project where a large sum of money or other resources have already been committed to the project, and the decision makers fear that they will lose their investment (Arkes & Blumer 1985:124; Hafenbrack, Kinias & Barsade 2014:6; Haller & Schwabe 2014).

**Saving Face Theory** suggests that decision makers will commit more resources in the presence of a large audience but that this situation is accompanied with elevated stress levels. Decision makers have a perception that people who know about their earlier decisions expect them to honour their prior commitments (Brockner, Rubin & Lang 1981:68; Staw & Ross 1989:218).

**Economic and Technical Side-bets Theory** describes how investors will consider spin-off projects from a main project in their decision making. The side-bets may in due course become so important that decision makers continue to invest in a failing project for the sake of the side-bets (Ross & Staw 1986:277).

**Economic Viability Theory** describes a situation where investors continue to believe in the economic viability of a project, despite evidence to the contrary (Garland 1990:729).

**Project Completion Theory** is cofounded with sunk cost and describes a situation where investors continue to invest in a failing project that is close to completion since they feel that only a small additional investment is required to complete the project (Garland & Conlon 1998:728).

**Optimism Bias** is a cognitive bias that leads decision makers to believe that they are less at risk of experiencing negative events and more likely to experience positive events (Lovallo & Kahneman 2003:2). Decision makers continue with additional investment in the failing project since they believe the project's failing situation will improve (Montibeller & Winterfeldt 2015).

### 2.3 Need for this research

Although the theory we propose for this study is not completely new, the manner in which we apply existing theories is. This study improves our understanding of decision making in an EoC experiment. It is expected that this will not only be applicable to the EoC literature, but also contribute to decision making research in general as previous experience and certain demographic indicators are embedded in psychological factors that may influence a person's psychological construct, and thus decision making ability.

The value of this research to organisations is to better understand the behaviour of project managers who are faced with a situation to escalate commitment, consider alternatives, or completely halt a course of action. This will allow organisations to make better-informed



decisions when appointing and training project managers, and assigning functions to decision makers. It will also allow them to anticipate future outcomes that may result from training, personal experience, and specific demographic indicators. Project managers will benefit from this study by understanding how their decisions are influenced by their own experience and demographic background.

### **3. CONCEPTUAL METHOD**

#### **3.1 Theories and methods used**

In this study, an experiment was conducted which presented respondents with a scenario of a financially troubled project, and gave them the option to stop or continue investing in the project.

This experiment was designed to include various determinants from past research. It also considered the fact that the determinants are not mutually exclusive. In his appraisal of past optimism bias research, Staw (1997) highlights the following determinants as the major causes for EoC behaviour:

- The sunk cost effect (Arkes & Blumer 1985:124)
- Self-justification (Staw 1976:27)
- Project completion (Garland & Conlon 1998:728)
- In-project optimism bias (Lovallo & Kahneman 2003:2)
- Economic and technical side-bets (Ross & Staw 1986:277)
- Saving face (Staw & Ross 1989:218)
- Economic viability (Garland 1990:729)

The motivational statements included in this research experiment tested for the respondents' level of support for the above determinants. Demographic information about each respondent was also collected as part of the experiment.

## **4. RESEARCH DESIGN AND METHODOLOGY**

### **4.1 Research strategy**

An experiment was designed to test EoC behaviour when the respondents were presented with a troubled project in five different stages of the project lifecycle, and with a different set of economic indicators for each scenario. One of the five scenarios was randomly assigned to each respondent.

Respondents had to evaluate the project scenario and decide whether to continue (escalate their commitment) or stop the project (not escalate their commitment). Specific statements were presented to test the EoC determinants identified from past research. Demographic questions were included to determine the correlation between the respondents' decisions and their demographic profile.

The respondents in the study were enrolled for a post-graduate master's degree in Engineering Management during 2014 at a leading South Africa university. Entry requirements for the master's degree are a four year degree or equivalent and a minimum of three years' work experience. It is therefore assumed that these respondents all have a similar level of education and at least three years of working experience which could influence their decision making in a project management environment.

### **4.2 Design and methodology of the experiment**

The design of the experiment considered the primary attribute of an EoC situation: a failing project with the choice to continue or stop the project. The initial choice is followed by a number of questions that must be answered by the respondents to motivate their decision. The experiment follows the same approach as previous decision making research by Staw (1976), Garland and Conlon (1993), Brockner *et al.* (2012), and Kahneman and Tversky (1979).

#### **4.2.1 Independent variables**

The experiment comprised of five scenarios which represented the project's percentage of elapsed time (20% (S20), 40% (S40), 60% (S60), 80% (S80) and 110% (S110)) based on the initial estimate. The amount of budget spent at each interval is also reported. This

approach is different from past research, which generally only referred to two intervals in the project lifecycle. The respondents in this study were given the choice to continue with the project that was presented to them, or to stop immediately and recover some of the invested money. The presented scenario read as follows:

*You are a manager in your organisation and a member of a committee responsible for recommending and selecting projects. Your company is conducting a project which you recommended with a planned cost of \$25 million (M) and a planned duration of 15 months. Before the project was started, the estimated Return on Investment (ROI) was 30%.*

*The project is now at the end of month 2 and the project manager has reported that the project is likely to take four months longer (i.e., 19 months) to complete. The actual cost to date for the project is \$5M and the project manager estimates that the project will cost \$8.5M more than originally planned (i.e., \$33.5M).*

*At a project review meeting, a decision must be made whether to continue with this project or not. If the project is stopped now, approximately \$2.5M of the investment can be salvaged in the form of equipment and material. The remainder is a sunk cost attributed to labour and consulting fees. If you stop the project, the unused money and salvaged equipment and material will be redirected towards other new or existing projects in the company.*

The elapsed times and investment amounts were varied in the five scenarios and are summarised in TABLE 1.

**TABLE 1: Experimental scenarios**

Parameters	Experimental scenarios				
	S20	S40	S60	S80	S110
Planned investment	\$25.0M	\$25.0M	\$25.0M	\$25.0M	\$25.0M
Planned return	\$32.5M	\$32.5M	\$32.5M	\$32.5M	\$32.5M
Gross profit	\$7.5M	\$7.5M	\$7.5M	\$7.5M	\$7.5M

Parameters	Experimental scenarios				
	S20	S40	S60	S80	S110
Planned ROI	30%	30%	30%	30%	30%
Actual duration (months)	2	5	7	10	15
Invested to date	\$5.0M	\$10.0M	\$15.0M	\$20.0M	\$28.0M
Salvage value if terminated	\$2.5M	\$5.0M	\$7.5M	\$10.0M	\$14.0M
Sunk cost if terminated	\$2.5M	\$5.0M	\$7.5M	\$10.0M	\$14.0M
Redeemed funds if terminated	\$22.5M	\$20.0M	\$17.5M	\$15.0M	\$11.5M
Revised total investment required	\$33.5M	\$33.5M	\$33.5M	\$33.5M	\$33.5M
Additional investment required	\$8.5M	\$8.5M	\$8.5M	\$8.5M	\$8.5M
Required investment to complete project	\$28.5M	\$23.5M	\$18.5M	\$13.5M	\$6.0M
Revised gross profit	-\$1.0M	-\$1.0M	-\$1.0M	-\$1.0M	-\$1.0M
Revised ROI with revised investment	-3.00%	-3.00%	-3.00%	-3.00%	-3.00%

Source: Developed for the present study experiment

#### 4.2.2 *Dependent variables*

The sunk cost and project completion determinants are interlinked or cofounded. As the project progresses over time in the project lifecycle, the sunk cost value for the project

increases. Although the questions in the experiment were designed to test both the determinants separately, it would be very difficult to view each determinant in isolation without taking the other determinant into consideration when formulating a decision to continue or stop the project.

After the respondents made a decision on whether or not to continue with the project, a further set of questions was presented to motivate the decision. Their options for motivation were limited to the questions that were presented, and each question was designed to test specific theories or determinants related to EoC, as pointed out in past research. In support of their decision, the respondents had to indicate to what extent they agreed or disagreed with the set of motivational statements presented to them, TABLE 2.

**TABLE 2: Motivational statements**

Motivational statement		Determinants tested
MS1	This project has already cost us a lot of money, and we cannot afford to spend more on it.	Sunk cost
MS2	I recommended the project and must see it through.	Self-justification
MS3	Even if we do not get business benefits from this project, there are enough other projects in the company to balance it out.	Economic viability, Optimism bias
MS4	We are not that far from the end of the project, we may just as well see it through.	Project completion
MS5	We usually get better than expected returns from projects over their useful life because of changes in market conditions and will eventually recover the investment.	Optimism bias (post project)
MS6	We have already invested a lot of money in the project and cannot let the investment go to waste.	Sunk cost
MS7	The benefits from the project are not only monetary, and there are many	Economic and

Motivational statement		Determinants tested
	other potential spin-offs that should be considered.	technical side bets
MS8	Even though the project is going to cost more, it is unlikely that we will lose the benefits; we will just make a bit less.	Optimism bias (in project)
MS9	A different decision could limit my future career opportunities or promotions in the organisation.	Saving face
MS10	Even though the project is overrunning now, we usually manage to recover lost time and cost overruns.	Optimism bias (in project)

Source: Developed for the present study experiment

A seven-point Likert scale (Weijters, Cabooter & Schillewaert 2010:35) was used with the values and corresponding descriptions shown in TABLE 3.

**TABLE 3: Seven-point Likert scale**

-3	-2	-1	0	1	2	3
Strongly disagree	Disagree	Disagree somewhat	Undecided	Agree somewhat	Agree	Strongly agree

Source: Adapted from Weijters *et al.* 2010:35

Following the decision to terminate or continue, and giving explanations for their choice, the respondents had to complete a set of demographic questions which, among other attributes, recorded their level of experience. This is important to this study since we want to determine to how experience influences the decision to escalate commitment.

## 5. RESULTS

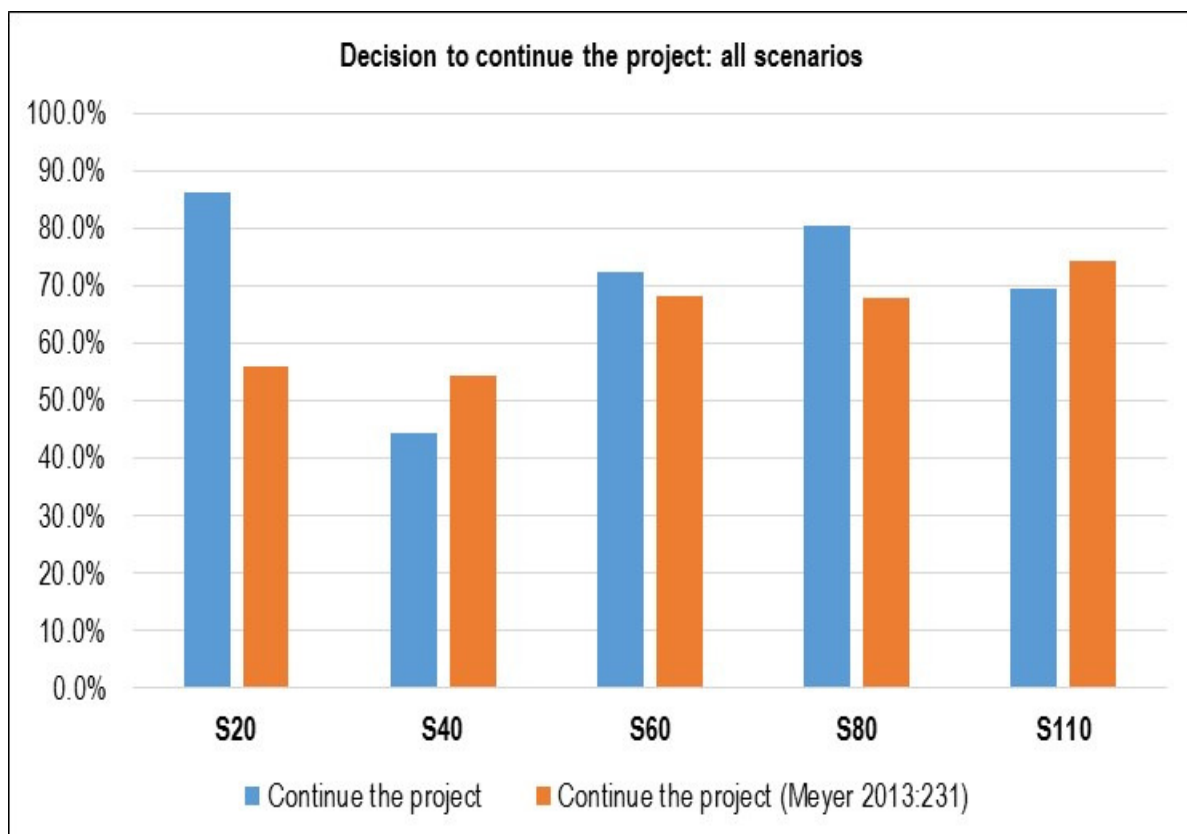
180 respondents completed the experiment. For each experimental scenario (S20, S40, S60, S80 and S110) responses were received from 36 respondents; the equal number of

respondents for each scenario is coincidental. The results were analysed to answer the previously stated research questions.

**Research Question 1:**

*Do MEM students exhibit the typical behaviour as determined and described in previous research on the theory of Escalation of Commitment?*

When considering all the experimental scenarios collectively, the majority of the respondents (70.6%) decided to continue with the project and approve the additional \$8.5M, while only a small portion (29.4%) decided to stop the project. The data obtained support the study of Meyer (2013:288) where 63.9% of respondents decided to continue with the project, FIGURE 1.



**FIGURE 1: Decision to continue compared to Meyer 2013:231**

Source: Constructed from experiment results

The results indicate that the respondents suffered from EoC behaviour, and more than 65% of the respondents continue with the failing course of action even after the project has exceeded its planned duration and cost.

These results show that MEM students, despite their project management specific training, exhibit the same behaviour as a randomly selected sample of the general population.

**Research Question 2:**

*Are certain predefined determinants more supported by the MEM students during the decision making process; and*

**Research Question 3:**

*Are certain predefined determinants more supported by the MEM students compared to previous research by Meyer (2013:288)?*

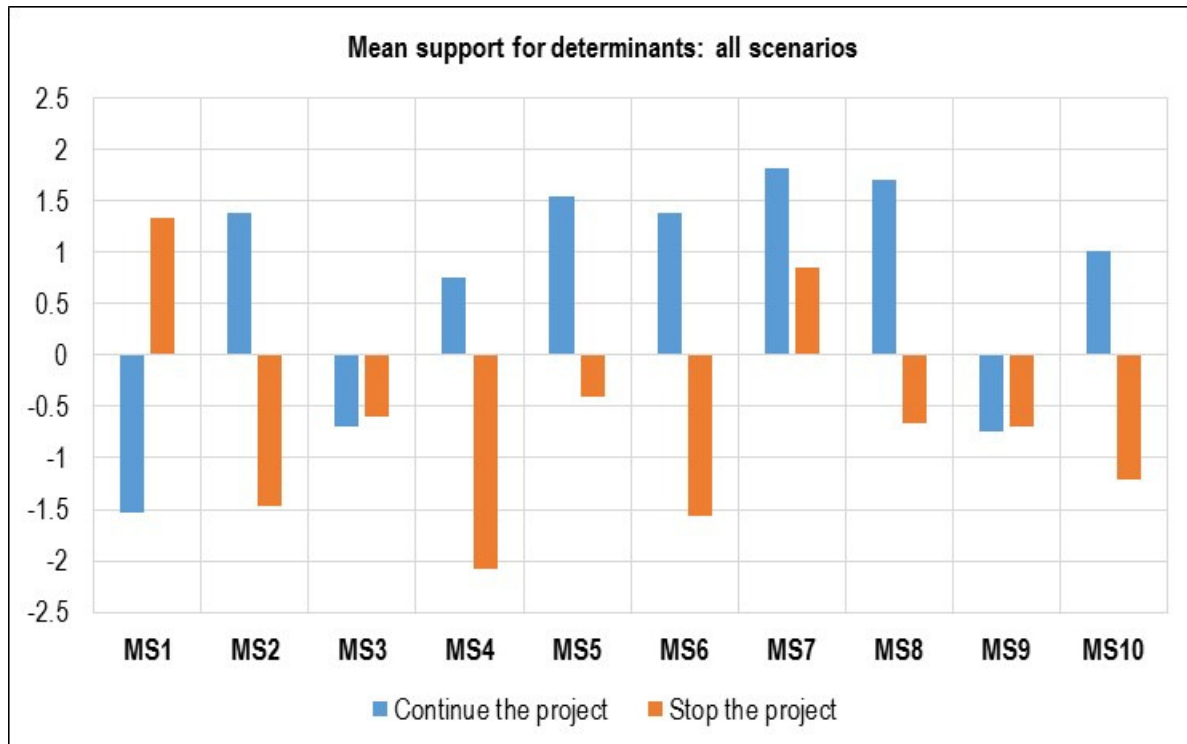
The information presented to the respondents in the experiment made it clear that the project is in trouble, since an additional investment of \$8.5M was required to continue, which would exceed the approved budget. Committing these funds would completely erode the financial gain of the project.

The results indicated that the respondents who decided to approve the additional investment and continue with the project supported the following determinants: self-justification, project completion, optimism bias post project, sunk cost, economical and technical side bets, and optimism bias in project.

The respondents' support for the 10 motivational statements are at similar levels to those found by Meyer (2013:290), who specifically used motivational statements MS5, MS7, and MS8 to test for optimism bias about the post-completion benefit that could be gained from the project. If the respondent decided to continue with the project, and support for these statements is positive, it would mean that the decision maker is overly optimistic about the outcome of the project when deciding to continue with a failing project. In this study, a similar trend was found where respondents who decided to continue with the project also supported motivational statements MS5 ( $M = 1.54$ ), MS7 ( $M = 1.82$ ) and MS8 ( $M = 1.71$ ), FIGURE 2 and TABLE 4.



This supports the notion that the decision makers are overly optimistic regarding the outcome of the project. MEM students may be more confident to see projects through as opposed to cancelling them, possibly due to their prior project management training.



**FIGURE 2: Mean support for determinants MS1 to MS10 for all scenarios**

Source: Constructed from experiment results

Motivational statement M9 ( $M = -.75$ ) tested whether decision makers continue the project for fear that their position in the company may suffer. This test is related to the saving face determinant. The results show that decision makers did not feel that future career opportunities or promotions may be lost as a result of their decision to continue with the failing project. This result supports the findings of Meyer (2013:213).

The results show that respondents who decided not to continue with the project had the same view of MS1 ( $M = -1.54$ ), MS3 ( $M = -0.69$ ), and MS9 ( $M = -0.75$ ) as reported by Meyer (2013:288).

Respondents who stopped the project justified their decision on the basis of economic viability, economic and technical side-bets, and saving face. Respondents who continued

with the project justified their decision on the basis of optimism bias in project, self-justification, optimism bias post project, and economical and technical side bets.

The results from this study show that MEM students support the same predefined determinants that were found in previous research.

TABLE 4 gives the means and standard deviations of the support for the 10 motivational statements for each of the project scenarios.

**TABLE 4: Mean and standard deviation per scenario and motivational statement**

Motivational statement	Decision	Mean	Scenario					All
		Std. dev.	S20	S40	S60	S80	S110	
MS1	Stop	M	-1.20	1.65	1.20	1.29	2.09	1.34
		SD	0.40	1.19	1.17	2.12	0.51	1.49
	Cont.	M	-1.74	-1.13	-1.65	-1.76	-1.16	-1.54
		SD	0.76	1.54	0.62	0.68	1.43	1.05
MS2	Stop	M	-1.04	-2.15	-0.70	-0.86	-1.36	-1.47
		SD	0.49	0.73	1.79	2.47	1.87	1.64
	Cont.	M	1.13	2.25	1.62	1.34	0.92	1.38
		SD	1.50	0.66	0.92	1.49	1.72	1.42
MS3	Stop	M	0.20	-0.35	-0.60	-1.86	-0.64	-0.60
		SD	0.75	2.39	1.36	0.99	1.97	1.95
	Cont.	M	-0.74	-0.75	-1.04	-0.31	-0.64	-0.69

Motivational statement	Decision	Mean	Scenario					All
		Std. dev.	S20	S40	S60	S80	S110	
		SD	1.39	1.39	1.09	1.68	1.83	1.53
MS4	Stop	M	-2.00	-2.40	-1.70	-2.29	-1.73	-2.08
		SD	0.00	0.58	0.64	0.45	1.14	0.77
	Cont.	M	-0.23	-0.50	1.04	1.52	1.64	0.76
		SD	2.18	1.73	1.22	1.16	1.09	1.77
MS5	Stop	M	-0.60	-1.25	-0.90	1.00	0.82	-0.40
		SD	0.80	1.30	0.83	1.41	1.70	1.61
	Cont.	M	1.35	1.69	1.77	1.41	1.56	1.54
		SD	1.43	1.10	0.97	1.27	1.13	1.22
MS6	Stop	M	-1.60	-1.45	-0.90	-2.14	-2.00	-1.57
		SD	0.49	1.16	0.83	0.64	0.00	0.94
	Cont.	M	0.45	1.81	1.50	2.00	1.44	1.39
		SD	1.64	0.73	1.45	0.79	1.47	1.43
MS7	Stop	M	0.60	1.30	-0.70	1.43	1.18	0.85
		SD	1.74	0.95	0.78	0.49	1.59	1.38
	Cont.	M	1.68	1.00	1.58	2.21	2.32	1.82
		SD	0.74	1.84	1.18	0.61	0.47	1.08

Motivational statement	Decision	Mean	Scenario					All
		Std. dev.	S20	S40	S60	S80	S110	
MS8	Stop	M	-0.40	-1.30	-1.00	0.43	0.00	-0.66
		SD	0.49	0.95	1.67	2.19	1.54	1.57
	Cont.	M	1.94	1.25	1.35	1.83	1.96	1.71
		SD	0.72	1.20	1.21	0.70	0.77	0.96
MS9	Stop	M	1.40	-1.10	0.10	-2.00	-0.82	-0.70
		SD	1.96	1.76	1.58	0.00	1.53	1.82
	Cont.	M	-1.26	-0.94	-0.88	-0.69	0.08	-0.75
		SD	1.65	1.48	1.37	1.32	1.57	1.55
MS10	Stop	M	-1.80	-1.35	-1.40	-0.14	-1.18	-1.21
		SD	0.40	1.46	1.36	2.17	1.19	1.51
	Cont.	M	1.06	0.06	1.15	1.21	1.24	1.02
		SD	1.24	1.78	1.49	1.40	1.21	1.45

Source: Calculated from experiment results

**Research Question 4:**

*Is there a difference in MEM students' decision to continue a project when considering the main demographic data, compared to previous research?*

62.9% of respondents from the mining sector decided to continue with the project. This is lower compared to the other industry sectors. This may be due to the fact that the business

variables are known in a mining project, specifically the current market price for commodities. If the market price for a commodity is low or shows high variability, the profits would not be certain and there would be no point in continuing the project, unless enough funds are available to strategically create stockpiles for future price recovery.

The percentage of respondents who decided to continue with the project in other industries are consulting: 72.2%, manufacturing: 78.3%, and energy: 80.7%.

The majority of the respondents work for companies with more than 5000 employees, and the biggest support (75.8%) for continuing with the project was from respondents who work for these companies. Larger companies could potentially be more politically orientated and therefore, to succeed in a larger company as a project manager, you would need to “play the politics” which results in supporting projects to the end. Larger companies may also have positive political networks and affiliations which could aid the project manager to achieve success in their projects.

Respondents who have been in a position of influence for between five to ten years showed more support (75.8%) for the decision to continue with the failing project. Respondents who have been in the position of influence for less than five years were more willing to stop the project, but still showed a relatively high support to continue with the project (69.2%). The more experienced project managers may believe that they have the knowledge, skills, and influence to make decisions that could save the failing project, while the less experienced and less knowledgeable project managers with less influence would rather stop the project, as they cannot foresee how a failing situation can be turned around.

Respondents who deal with projects that take between 6 and 12 months to complete were more likely to continue with the project (76.9%) than those who deal with projects with longer durations.

Respondents who work with higher value projects are more likely to continue with the troubled project; 84.6% for project between \$5million to 1\$billion, and 90% for projects over \$1billion. More expensive projects may pose greater losses to the organisation if they are cancelled, hence the higher support for continuation.

It should be noted that the cost and potential loss was known for the experimental project scenarios. The project managers that usually work with more expensive projects may have

considered the loss in this experimental project to not be as significant, since their frame of reference is much more expensive projects.

The study results show high levels of escalation with some significant differences between the respondents based on demographic factors.

## **6. RECOMMENDATIONS**

From this research it is apparent that various opportunities to further study and investigate the underlying aspects of EoC exist. This same experiment can be used across various target groups in the same manner it was presented to MEM students in this study, in order to identify and analyse similarities or differences in decision making.

A further study could be undertaken to determine whether students from different management schools differ in their decision making. A valuable contribution can be made to assess Masters of Business Administration (MBA) students who occupy managerial positions in organisations.

Similar studies could also be done across cultural boundaries to determine whether there are similarities between the South African respondents and respondents from cultures with different management philosophies.

The results from this study highlight decision making behaviour of MEM students. These results could be incorporated in their training curriculum to ensure that project managers are aware of the underlying factors that affect their decision making.

It is further recommended that project management training courses should include specific coverage of financial and non-financial decision making methods.

## **7. CONCLUSION**

Based on the answers to the research questions, the results from this study strongly suggest that project management training at an advanced level (master's degree) does not improve the ability of decision makers to identify and terminate a project that is clearly failing. This finding should be a concern to both governments and private organisations that conduct projects since these organisations invest substantially in project management training with the aim of improving successful project delivery.

This study builds on the existing literature related to the behavioural theory of EoC and further supports previous findings by Brockner (1992:41), Staw (1997:192), Garland and Conlon (1998:2040), Teger (2013:13), and Meyer (2013:288). The way the theory was applied in this study improves the understanding of decision making theory that is applied in an EoC experiment and carried out on a specific target audience.

This research study is not only applicable to the EoC literature or study field, but also contributes to decision making research in general, as previous experience and certain demographic indicators are embedded in psychological factors that may influence a person's psychological construct, and thus decision making ability.

Through this research, organisations gain a better understanding of the behaviour of well-qualified project managers when dealing with troubled projects. Project managers in general can benefit from this study since they may identify their own behaviour in the defined determinants and question their approach to dealing with troubled projects.

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