INFORMATION AND INCENTIVE MECHANISMS FOR ALIGNING PRINCIPAL AND AGENT INTERESTS IN ESCALATION SITUATIONS

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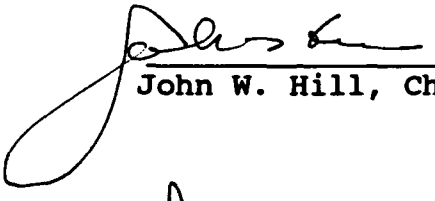

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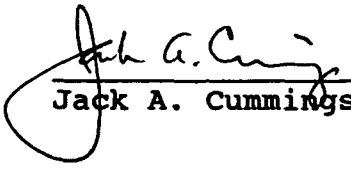

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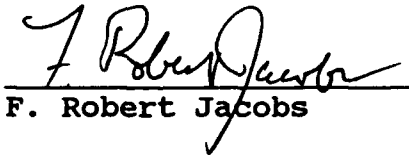

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To my husband, Don, who provides constant support throughout my many endeavors and to my children, Daniel and LaRisa, who are old enough to understand the importance of advanced education and yet are young enough to remind me of the importance of having fun.

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ABSTRACT

The selection and management of new products are important issues due to the large capital investments required to bring a new product on-line. A major problem is a tendency for managers to become overly committed to a new product even when costs have been suffered which indicate the product is not economical for the firm. In recent literature, this problem has been called "escalation to commitment to a failing course of action" or simply "escalation".

Escalation appears to be a common problem in several types of investment decisions. When producing new products, for example, a series of investments over several years is often required during which time production levels are increased incrementally towards full production. Managers may decide at several decision points to continue with an uneconomical product rather than terminate production.

Past research has documented several psychological factors for escalation such as a desire by managers to justify their initial product decisions. The current study, however, examines economic factors for escalation. Prior analytical research has been inconsistent with respect to the effect of agency conflict on escalation. The current study attempts to clarify previous findings by examining the agency variables of

information asymmetry and incentives such as compensation scheme and threat of detection and their effect on escalation.

A laboratory experiment was used to assess the impact of information asymmetry with regard to accounting information; compensation scheme; and a threat of detection on the decision to escalate. The empirical results supported the hypothesis that agents are more likely to escalate with a higher degree of information asymmetry between principal and agent than with a lower degree of information asymmetry. However, the hypotheses regarding compensation scheme and the threat of detection were not supported. This research suggests that decreasing information asymmetry between a principal and agent could reduce the incidence of escalation in product continuance situations.

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CHAPTER 1

INTRODUCTION

Field research has shown that assigning indirect costs to products using accounting systems based on traditional volume-based pooling and allocation techniques often results in greatly distorted product costs [Cooper & Kaplan, 1988; Shank & Govindarajan, 1989]. For example, consider a division that begins producing a new product in a plant already making two products that are in full production. During the phase-in period, far fewer units of the new product will typically be produced than units of the established products. If the indirect costs of production are assigned to products using traditional volume-based measures, it is likely that the higher volume, established products will absorb a proportionately larger share of all indirect costs, including the indirect costs associated with the new product. This implies that the new product will be undercosted and its reported profitability will be higher than its actual profitability.

If, as is often the case, the phase-in of the new product involves a series of milestone decision points at which division management must decide whether to incur additional

costs to expand production of the new product, distorted product costs may influence such decisions. Milestone product decisions based on distorted product costs can result in an agency conflict due to information asymmetry. If a principal (corporate function) receives accounting reports reflecting downwardly biased product costs for a new product, then an agent (division manager) who has incentives to continue product implementation may be inclined to do so even though the agent has private information that it is uneconomic for the firm to incur the additional costs required to move the new product towards full production. This type of continuance decision has been frequently termed "escalation to commitment to a failing course of action" or simply "escalation." Although this definition has been interpreted differently across research environments, an operational definition is that a "failing course of action" is one that is uneconomic from the firm's perspective.

Early escalation research focused on escalation as resulting from various types of cognitively related determinants such as self-justification of prior decisions [Staw, 1976; Staw & Ross, 1987]. Recent accounting research, however, has attempted to analytically explain escalation as resulting from an agency conflict [Kanodia et al., 1989]. This dissertation extends this research by empirically testing agency variables which are hypothesized to effect escalation decisions. These variables are the degree of information

asymmetry between the principal and agent, type of compensation scheme, and the likelihood of detection of an escalation decision. Specifically, the decision to continue implementation of an uneconomic product is hypothesized to be positively related to (1) the degree of information asymmetry arising from an agent reporting to the principal under traditional pooling and allocating costing (PAC) techniques as opposed to activity based costing (ABC) and (2) an agent's bonus-plus-tournament compensation scheme which provides a relatively large tournament incentive for the agent to take actions that do not maximize the principal's expected utility. In addition, an agent's decision to escalate is hypothesized to be inversely related to the threat of detection by the principal. Each of the agency variables are discussed in the following paragraphs.

ABC is alleged to result in more accurate product costing than PAC because it directly traces most costs to products rather than aggregating the costs into pools and then allocating the costs on the basis of production volume measures such as units produced or direct labor hours [Shank & Govindarajan, 1989]. Therefore, the degree of consonance between accounting information and the underlying economics of production is greater under ABC than under PAC and results in less information asymmetry. Under PAC, products that are produced in larger volumes absorb more indirect costs despite the fact that these costs (e.g., set-up costs) are often

generated by low volume products.[1] Field research indicates that division personnel are often far more aware of the magnitude of these distortions than are corporate personnel.[2] If principals receive accounting reports derived using PAC, they would be less likely to detect escalation decisions than if they receive reports derived using ABC, thereby, affording the agent more latitude to escalate under PAC than under ABC.

Different compensation schemes can affect escalation to the extent that they differentially align the behavior of the agent with the goals of the principal [Eisenhardt, 1989; Namazi, 1985; Kanodia et al., 1989; Conlon & Leatherwood, 1989]. Bonuses that are triggered by individual performance and coupled with tournament (winner take all) incentives are expected to encourage agents to make decisions that benefit the agent at the expense of the principal [Ashton, 1990]. Intuitively, when the tournament is a relatively large incentive (e.g., a promotional opportunity), the agent is even

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[1] As long as storage costs are small, low volume products would typically be produced in batches which minimize set-up costs for established production lines. However, new products often have many, small prototype production runs due to the need to ramp-up and/or make production changes.

[2] Field research undertaken by the author at several multi-national corporations including producers of pharmaceuticals, household products, oil and chemical products, heavy equipment and component parts, indicates that divisional managers have more detailed cost information than corporate personnel and that corporate personnel seldom ask for more than summary information. In addition, product costs are seldom audited in any attempt to gain accurate cost data. One manager stated that the critical factor in the information gap is the "perception of upper management" in that they do not want to hear "bad" news.

more likely to make self-serving decisions than if the tournament is relatively small (e.g., a small monetary award).

In addition, the threat of detection can affect an agent's behavior. Assuming there is a cost to the agent associated with the principal detecting inappropriate behavior, the agent is more likely to behave in the interests of the principal if the principal can obtain information to verify agent behavior [Eisenhardt, 1989]. An operational internal audit gathers evidence that is informative about of an agent's behavior and can substitute for actual observance of an agent's behavior. At a high probability of audit, agents are expected to escalate less than at a low probability of audit.

The hypotheses are tested using a computer-aided, laboratory experiment in which subjects (agents), acting as division managers, are asked to select a product to take into production. Subsequently, the subjects are asked to decide whether to continue funding the product to full production after receiving private information that indicates that discontinuing the product is economically advantageous for the principal. Although all agents received the same private information, information asymmetry between the principal and an agent was manipulated by the type of report (PAC or ABC) that the agent submitted to the principal. Agents were paid through one of two bonus-plus-tournament compensation schemes based on individual agent performance. In addition, agents

were subject to random operational internal audits with one of two probabilities of audit.

This study contributes to our understanding of escalation, agency problems, accounting, and incentives in several ways. First, escalation can be a material problem for many firms, especially when new products or projects are being introduced. Evidence provided by this study has normative implications for designing information systems to address escalation behavior. Second, this study represents the first known empirical test of specific agency variables in escalation situations. Although prior research has analytically demonstrated the importance of agency variables in escalation decisions, this research provides empirical evidence about the importance of these agency variables. Third, agency research has often assumed information asymmetry [Baiman, 1982; Namazi, 1985; Eisenhardt, 1989], but little of this research has addressed how information asymmetry develops. This study addresses this question by using alternative costing systems that have recently received a great deal of attention in the practitioner literature [Raffish, 1991; Cooper, 1990, 1991; Drury, 1990; Cooper and Kaplan, 1988; Beischel, 1990; O'Guin, 1990]. This attention, however, has focused on the allegedly superior information properties of ABC for decision-making purposes and has typically not addressed its implications for reducing information asymmetry and agency costs. Fourth, despite the

profound effect that tournament incentives, such as promotional opportunities, may have on agent behavior in the real world, little agency research has incorporated such incentives into tests of agent decision-making. Finally, the role that the threat of detection plays in escalation behavior is empirically examined by including a low and high probability of an operational internal audit.

The remainder of this dissertation is organized as follows. The problem of escalation and how agency theory relates to escalation are discussed in Chapter 2. In Chapter 3, the hypotheses are developed, and the research methodology is described in Chapter 4. The data analysis and results are presented in Chapter 5. Chapter 6 provides a summary and discussion of implications, limitations, and future research directions.

CHAPTER 2

THEORETICAL BACKGROUND

As mentioned in Chapter 1, escalation occurs when an agent commits additional resources to a product after obtaining information that indicates that terminating the product would be more economical for the principal.[3] Staw and Ross [1987] indicate (1) that an agent is more likely to escalate if the agent is committed to the product, and (2) that commitment to the product is likely to result when the agent has been involved with implementing the product and the agent's actions have been explicit, freely chosen, visible to others, irrevocable, repeated, and important to the agent.

Published examples of escalation abound in regulated industries and in the Department of Defense.[4] Regulators' decisions to keep failing savings and loan institutions open

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[3] A corporation may produce a product which is not profitable if doing so is consistent with the corporation's long term strategy. For example, a high technology product for the Department of Defense may be produced at a loss if it may later have commercial applications. This research deals with products which are based on proven technology and which are expected to be profitable.

[4] While escalation occurs in unregulated industries, it is often difficult for people outside a company to obtain information about escalation problems. For example, while the Air Force experienced highly publicized cost overruns on the C-5A, Boeing and its suppliers quietly swallowed the added costs of technical unknowns on the C-5A's commercial counterpart [Gregory, 1989].

are examples of escalation. Conlon and Leatherwood [1989] cite an oil and gas properties loan by Penn Square Bank in which the borrower [Dutcher, 1985] states:

> ...bankers cure a problem loan by lending more money to the source of the problem. By the time the loan becomes so hopeless that even a bank examiner can see the problem, it's too late to recapture the collateral and sell it for the amount of the loan.

A military example of escalation concerns the C-5A wide-body transport. One of the C-5A's original requirements was to be able to land near combat on unprepared fields. During pre-production, it should have been apparent that the aircraft was too costly, too easily damaged, and too valuable to land near combat [Sammet and Green, 1990; Gregory, 1989]. However, the military continued to fund this requirement through full-scale development and deployment of the C-5A.

Prior research on escalation has focused primarily on non-economic explanations for escalation [Staw, 1976, 1981; Fox and Staw, 1979; Singer, 1986; Staw and Ross, 1987; Leatherwood and Conlon, 1987; Conlon and Parks, 1987]. Based on their review of the psychological literature, Staw and Ross [1987] conclude that escalation is due to self-justification, face-saving, distaste for quitters, institutional inertia, preserving the investment, competition, and/or political promises. Recently, however, researchers have examined the effect of economic factors on escalation. Kanodia et al. [1989] analytically demonstrate that escalation can be

economically rational behavior for agents due to reputation effects. Specifically, Kanodia et al. show that agents can maintain their human capital in the labor market by making decisions that do not reveal previous "bad" decisions.

Consistent with the agency perspective taken by Kanodia et al. [1989], this dissertation views escalation as an economic problem. The corporation is viewed as consisting of a single principal (i.e., corporate headquarters) who employs *n* agents (i.e., division managers) who each make decisions on behalf of the principal. Due to the physical separation of the principal from an agent's workplace, the agent, but not the principal, has direct access to information about local conditions. This differential access to information results in information asymmetry between the principal and the agent. Because of the information asymmetry, the principal is sometimes unable to verify whether the agent is making decisions that are in the principal's best interests. Thus, the information asymmetry between the principal and the agent leads to a condition of moral hazard.

The principal can attempt to mitigate the moral hazard problem in three ways. First, the principal could try to reduce the degree of information asymmetry with the agent. When the principal obtains more information to assess the appropriateness of the agent's decisions, the agent is more likely to make decisions that are consistent with the principal's goals [Young, 1985; Chow et al., 1988; Eisenhardt,

1989]. Second, the principal could structure the agent's compensation package so that it provides the agent with incentives to make decisions that are consistent with the principal's goals [Namazi, 1985; Nalebuff and Stiglitz, 1983]. Third, the principal could increase the threat of detection to motivate agents to make decisions which benefit the principal [Awasthi, 1990]. These three alternatives are discussed in the next chapter.

CHAPTER 3

DEVELOPMENT OF HYPOTHESES

3.1 Information Asymmetry

A common way in which the principal can attempt to reduce information asymmetry with the agent is through the company's accounting information system. Specifically, the principal gathers information through the periodic accounting reports the agent submits to the principal. Consider a situation in which the agent, through direct contact with subordinates, has access to specific product cost information, such as production engineering costs or the number of set-ups, but the principal receives only general information about capital investments.[5] This general information takes the form of accounting reports that report the aggregate profit contribution for the division and the profitability of each of the division's products. The manner in which costs are allocated to products can affect the accuracy of the profits, and hence the usefulness of the information, reflected in

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[5] Principals are involved in strategic decision making and receive specific economic information on strategic decisions such as the research and development of new products. However, principals are usually not involved in routine operational decisions concerning production problems which are incurred during the implementation of new products [Mehtabdin, 1986]. Principals delegate responsibility to division managers and usually only receive economic information in summary form.

these reports. Therefore, the type of accounting report submitted to the principal can affect the degree of information asymmetry between the principal and the agent, and hence the magnitude of the moral hazard problem.

Two cost allocation methods are traditional pooling and allocation of costs (PAC), which is used by many companies [Cooper and Kaplan, 1988], and activity based costing (ABC). With PAC, manufacturing overhead costs incurred by a specific product are not directly traced to the units of that product produced. Rather, these costs are pooled and allocated to the units produced of all products using one or more bases related to production volume.

ABC differs from PAC in how overhead costs are assigned to products. ABC directly traces manufacturing overhead to products which results in better economic information [Kaplan and Atkinson, 1989]. Specifically, ABC recognizes that overhead costs are influenced by factors other than volume [Beischel, 1990], so costs are assigned to products based on cost-causing activities, termed "cost drivers." Typical cost drivers include set-up labor, machine overhead, receiving orders, packing orders, and work orders generated by each product [Shank and Govindarajan, 1989]. Any remaining costs are assigned to units produced using the best base identified.

Appendix A describes how overhead (i.e. set-up cost) is reported in work-in-process accounts under PAC and ABC. Under PAC, set-up costs associated with producing units of a new

product are allocated to each unit produced of both old and new products as a cost of producing inventory [Kaplan and Atkinson, 1989]. Therefore, PAC often results in high volume products "subsidizing" newer, low volume products by absorbing more overhead than they created. Under ABC, set-up costs are assigned to the specific products which incurred the costs. Therefore, accounting reports prepared using PAC contain less accurate product economic information than reports prepared using ABC. This implies that the principal should find the information contained in reports prepared using PAC to be less useful than information in reports prepared using ABC for evaluating the appropriateness of the agent's decisions.

Table 3.1 illustrates the effect of using PAC and ABC on product profitability [adapted from Shank and Govindarajan, 1989]. Consider a multi-product division that already has two established products (Products A and B) and is phasing in a new product (Product C). The division produces 10,000 units of A; 15,000 units of B; and 5,000 units of C, and total overhead costs are $1,703,000. If the division uses PAC to allocate overhead costs, an equal amount of the costs will be allocated to each of the 30,000 units produced. Therefore, each unit produced would be allocated $56.77 of overhead. Alternatively, with ABC, the overhead costs are assigned to the units produced using the identified cost drivers.

TABLE 3.1

ILLUSTRATION OF PRODUCT COSTING UNDER PAC AND ABC

	PRODUCT A	PRODUCT B	PRODUCT C
UNIT COST			
PAC[1]	**86.77**	**93.44**	**71.77**
ABC[2]	**62.02**	**77.24**	**169.84**
SELLING PRICE/UNIT	162.61	125.96	121.55
PROFITABILITY/UNIT			
$ GROSS MARGIN			
PAC	75.84	32.52	49.78
ABC	100.59	48.72	-48.29
% GROSS MARGIN			
PAC	47%	26%	41%
ABC	62%	39%	-40%
[1]PAC PER UNIT COST			
RAW MATERIAL	20.00	30.00	10.00
DIRECT LABOR	10.00	6.67	5.00
ALLOCATED OVERHEAD	56.77	56.77	56.77
TOTAL	86.77	93.44	71.77
[2]ABC PER UNIT COST			
RAW MATERIAL	20.00	30.00	10.00
DIRECT LABOR	10.00	6.67	5.00
ASSIGNED COSTS BASED ON:			
SET-UP LABOR	.02	.04	.44
MACHINE OVERHEAD	17.50	23.33	35.00
RECEIVING	1.20	3.00	48.60
ENGINEERING	12.50	11.67	40.00
PACKING	.80	2.53	30.80
TOTAL	62.02	77.24	169.84

NOTE: Table 3.1 is adapted from Shank and Govindarajan [1989]

As is evident from Table 3.1, both reported costs and gross margin for each product are quite different under PAC and ABC. Product C, the new product, has a positive gross margin of 41% under PAC, but a negative gross margin of 40% under ABC. On the other hand, the gross margins of the two established products are higher under ABC than under PAC. These differences can be attributed to how the overhead costs associated with the new product are allocated under PAC and ABC.

This example is not atypical. With PAC, high volume products are generally overcosted relative to low volume products due to the allocation of overhead costs based on production volume as opposed to cost drivers [Shank and Govindarajan, 1989; Cooper, 1990]. There should be more information asymmetry between the principal and the agent under PAC than under ABC. With a higher degree of information asymmetry, an agent is more likely to escalate since the principal is less likely to detect escalation behavior.

> H_1: *Ceteris paribus*, agents are more likely to escalate with a higher degree of information asymmetry between principal and agent (i.e., under PAC) than with a lower degree of information asymmetry between principal and agent (i.e., under ABC).

3.2 Compensation Schemes

As discussed in Chapter 2, the principal can use

compensation schemes to align the agent's behavior with the principal's goals [Healy, 1985], thereby mitigating the moral hazard problem. Under bonus based compensation schemes, an agent's compensation usually consists of a base salary and a bonus if the bonus trigger is achieved.[6] The bonus gives the agent a direct stake in the outcome and can be used to encourage efficient work effort [Moe, 1984; Eisenhardt, 1989].

In this study, two bonus-plus-tournament compensation schemes are examined to determine their effect on an agent's propensity to escalate. Tournament incentives can exacerbate goal incongruence between principal and agent which can result in an agent escalating to maximize individual compensation without maximizing the company's overall profits.[7]

A promotional opportunity represents a tournament bonus in that a promotional opportunity is winner take all. A compensation scheme with a large potential tournament award, such as a promotion, is expected to exacerbate any goal incongruence between the principal and the agent and to have a detrimental effect for the principal [Ashton, 1990]. A promotion is especially important to an agent since it is unlikely that the promotion, once granted, will be taken away

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[6] Bonus schemes are often used to reward corporate executives [Healy, 1985]. According to Inc.'s 1990 Executive-Compensation Survey, at least 79% of companies relied on cash bonuses to retain top executives [Fraser, 1990].

[7] Baiman [1982] equates a principal's expected return with his residual claim on the firm's cash flow. To the extent that profits proxy for cash flows, the assumption that maximizing firm profits maximizes the principal's expected utility is reasonable.

at some later period.[8] Intuitively, large tournament incentives (e.g., promotional opportunities) are preferred to small (e.g., small monetary awards). Therefore, escalation is expected to be more prevalent under a compensation scheme with a relatively large tournament incentive than a compensation scheme with a relatively small tournament incentive. The hypothesis follows:

> H_2: *Ceteris paribus*, agents are more likely to escalate if the compensation scheme includes a relatively large tournament incentive than if the compensation scheme includes a relatively small tournament incentive.

3.3 Threat of Detection

The basic agency structure consists of a principal and an agent who have differing goals [Eisenhardt, 1989]. In addition, the principal does not know to what extent an agent is productive since the principal lacks the ability to observe an agent's behavior [Moe, 1984]. Therefore, the agent can take actions which exploit goal incongruence and lack of observability. However, the principal can use a monitoring system to monitor agent behavior. A monitoring system that can reveal an agent's private information to the principal is likely to motivate agents to make decisions which benefit the principal providing there is a cost to the agent associated with the principal detecting inappropriate behavior [Awasthi,

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[8] Field research conducted at several multi-national corporations support this statement.

1990]. In a participative budgeting setting, Awasthi found that subjects facing a higher probability of audit created less slack in their budgets. In addition, Magee [1980] shows that a principal may benefit economically by randomly auditing or monitoring the agent's pre-decision information and imposing a penalty for inconsistent decisions. Thus, monitoring serves as a threat of the principal detecting inappropriate behavior on the part of the agent and can affect the agent's escalation decisions. The expected cost of escalation (e.g., being fired, passed over for promotion, loss of reputation, and so forth) is greater with a high threat of detection than a low threat of detection. Therefore, given a cost to the agent associated with detection, the increased probability of detection under a high threat should reduce escalation behavior more than under a low threat. The hypothesis follows:

H_3: *Ceteris paribus*, agents are more likely to escalate with a low threat of detection than a high threat of detection.

CHAPTER 4

RESEARCH METHODS

4.1 Overview of Experimental Design and Task

The hypotheses were tested in a laboratory experiment using undergraduate students enrolled in advanced accounting courses and MBA students.[9] Studies that have focused on decision making have found considerable similarities in the decisions of students and actual managers [Ashton and Kramer, 1980] and students were expected to be adequate surrogates for this task.

A 2 x 2 x 2 factorial design (see Figure 4.1) was obtained by crossing two degrees of information asymmetry (information asymmetry with PAC versus with ABC), two tournament incentive schemes (small and large), and two levels of audit probability (low and high). Subjects were randomly assigned to the eight experimental conditions.

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[9] Both undergraduate and MBA students were used in a pilot test. While statistical analysis was not possible due to the small number of subjects, both groups appeared to be appropriate subjects. Analysis of the experimental data indicates there are significant differences in age, grade point average, and work experience as would be expected. However, there was no difference in whether the students had coursework in escalation.

FIGURE 4.1

EXPERIMENTAL DESIGN

		TOURNAMENT INCENTIVE			
		SMALL		LARGE	
		THREAT		THREAT	
		LOW	HIGH	LOW	HIGH
INFORMATION ASYMMETRY	PAC				
	ABC				

Each subject acted as a manager of a multi-product division in a multi-divisional corporation for two periods. A subject's initial task was to select one of two new products to add to an established product line and later to decide whether to commit funds to expand the new product to full production. Regardless of which product the subject selected, the subject received feedback prior to deciding whether or not to continue funding the product that indicated discontinuing the product was the optimal action for the corporation. Subjects were also asked at the end of each production period to set target production levels for the established products. Since production levels were set at the end of the period, subjects were not asked to set production levels for Period 1.

Production levels for the new product were incrementally increased and given to the subjects at the time they were asked whether they would continue funding the new product. The experimental procedures are explained in subsection 4.4.

4.2 Independent Variables

(1) Information Asymmetry - Differing degrees of information were provided by using two different cost reporting systems. While all subjects received the same new product cost information, the division report to corporate headquarters varied in how overhead costs were allocated/assigned to individual products. One report, labeled New Product Cost Information, provided each subject with detailed economic cost information about the new product. It represented a compilation of costs collected by the subject from subordinates and other departments. The New Product Cost Information report was not routinely provided to corporate headquarters (the principal). The second report, labeled the Division Product Contribution Report to Corporate Headquarters, contained summary product cost information which was submitted by the subject to corporate headquarters. Each of these reports are explained in the following paragraphs.

The New Product Cost Information report (see Table 4.1) contained budgeted and actual manufacturing costs and the resulting variances for the new product. The large variance for production engineering represented the negative feedback

received by the subjects. Production engineering costs are engineering costs which are incurred after research and development for product redesign or for making changes in the factory to make the product producible. Subjects were told that the variance was due to custom engineering which was required to meet individual customer specifications and that customizing required changing the production line on a continuing basis. Because of the customizing requirement, the level of production engineering costs was expected to remain the same in later periods. In order to assess escalation behavior, subjects were told that the excess costs could not be recouped by increasing the selling price of the new product due to the availability of alternative products on the market.

TABLE 4.1

NEW PRODUCT COST INFORMATION
(In Thousands)

	BUDGETED	ACTUAL	VARIANCE
Raw Material	$102	$101	$ 1
Direct Labor	187	186	1
Production Engineering	85	142	-57
Machine Overhead	20	22	-2
Marketing	112	110	2
Distribution	40	40	0
Administration	76	75	1
Totals	$622	$676	$-54

The Division Product Contribution Report to Corporate Headquarters differed depending on the information asymmetry condition. Production engineering costs on the new product were allocated using PAC for the high information asymmetry condition (see Table 4.2) and ABC for the low information asymmetry condition (see Table 4.3). Production engineering costs are generally included in manufacturing overhead as implementation costs of producing a new product. With PAC, production engineering costs are typically accumulated and allocated on a volume basis to all units produced of both established products and the new product. Therefore, the higher-volume, established products bear most of the production engineering costs of the new product, resulting in the new product appearing to be more profitable than is actually the case. With ABC reporting, production engineering costs are accumulated and assigned directly to the products that create the costs. In this case, production engineering cost overruns are assigned to the new product reflecting a cost pattern that indicates continuing the new product is not the most economical decision for the corporation.

TABLE 4.2

PAC VERSION

DIVISION PRODUCT CONTRIBUTION REPORT
TO CORPORATE HEADQUARTERS
(In Thousands)

	PRODUCT A	PRODUCT B	NEW PRODUCT	DIVISION TOTAL
Sales	$2,500	$1,200	$ 720	$4,420
Raw Materials	400	200	101	701
Labor	550	220	186	956
Manufacturing Overhead	200	145	9	354
Mfg Contribution Margin	1350	635	424	2409
Mfg Contribution %	54.0%	52.9%	58.9%	54.5%
Less Other Expenses				
Marketing	130	85	110	325
Distribution	60	60	40	160
Administration	100	70	75	245
Production Contribution	1060	420	199	1679
Product Contribution %	42.4%	35.0%	27.6%	38.0%
Less Division Expenses				200
Division Contribution				1479
Division Contribution %				33.5%

TABLE 4.3

ABC VERSION

DIVISION PRODUCT CONTRIBUTION REPORT
TO CORPORATE HEADQUARTERS
(In Thousands)

	PRODUCT A	PRODUCT B	NEW PRODUCT	DIVISION TOTAL
Sales	$2,500	$1,200	$ 720	$4,420
Raw Materials	400	200	101	701
Labor	550	220	186	956
Manufacturing Overhead	100	90	164	354
Mfg Contribution Margin	1450	690	269	2409
Mfg Contribution %	58.0%	57.5%	37.4%	54.5%
Less Other Expenses				
Marketing	130	85	110	325
Distribution	60	60	40	160
Administration	100	70	75	
245				
Production Contribution	1060	475	44	1679
Product Contribution %	42.4%	39.6%	6.1%	38.0%
Less Division Expenses				200
Division Contribution				1479
Division Contribution %				33.5%

(2) Compensation Scheme - The compensation manipulation consisted of two bonus-plus-tournament schemes. While both schemes had the same base salary and bonus amounts, the tournament incentive was set at either a relatively small amount or a relatively large amount.

All subjects were told that they would earn a fixed wage of $2 plus be eligible for a bonus of $3 if a division contribution margin percentage of at least 25% was achieved. Subjects working under the small tournament incentive who achieved the target division contribution margin percentage were also eligible for a lottery in which one subject would receive a tournament bonus of $5. Subjects working under the large tournament incentive who achieved the target division contribution margin percentage were eligible for a tournament bonus of $50.

The division contribution margin percentage was based on division sales and expenses reported in each period. Sales and expenses in Period 1 were the same for all subjects under PAC reporting and the same for all subjects under ABC reporting regardless of which new product was selected. In Period 2, product sales and expenses reported at the end of the period varied according to whether subjects continued the new product they selected in the first period. Subjects were informed that discontinuing a new product would result in writing-off the costs already capitalized for the new product which would increase manufacturing expenses during Period 2.

Because of the write-off, discontinuing a product would make it harder for subjects to reach the target division contribution margin percentage in Period 2.

(3) Threat of Detection - To simulate the chance of a subject's escalation decision being detected, subjects were told that there was either a 10% (low) or 40% (high) chance of an operational internal audit. Subjects were told that the purpose of the operational internal audit was to uncover information that would otherwise not be available to corporate management such as the information compiled by the agent in the New Product Cost Information report. Subjects were told that if the quality of their overall production decisions were considered low by the auditor, they would not be eligible for either the bonus in the next period or the tournament incentive.

4.3 Dependent Variables

The dependent variables measured a subject's propensity to escalate. Several prior studies have measured escalation behavior using the dollar amount of additional funds managers allocate to continue uneconomic products or projects [Staw, 1976; Staw and Fox, 1977; Fox and Staw, 1979; Conlon and Wolf, 1980; Northcraft and Wolf, 1984; and Conlon and Parks, 1987]. This measure, however, captures the extent of escalation as opposed to the decision to escalate. Further, as Leatherwood and Conlon note, allocations that are less than the full

amount needed to continue the project or product "...can be interpreted in several ways: as a punishment, as an attempt to constrain or control future spending, as a desire to extend a project's completion horizon, or as a mistrust of the cost projections" [1987, p. 840]. To eliminate this interpretation problem, this study used a subject's continue/terminate decision as the primary measure of escalation behavior. In addition, subjects provided a self-rating of their confidence in their continue/terminate decision (on a scale of 0 to 9). This measure was used to evaluate the strength of the relationship between a subject's decision and the independent variables.

4.4 Administration of Experiment

The experimental instrument, which was adapted from an interactive computer experiment developed by Ruchala [1991], is provided in Appendix B. Each subject acted as a manager of a multi-product division. Subjects were not told how many new products or periods were in the experiment. The experiment consisted of four parts, which are detailed below.

Part 1

The experimenter distributed the informed consent forms and instructions to the subjects. The instructions provided information on the corporation, sample cost reports, and an explanation of how subjects would be compensated. In

addition, production decisions and the operational internal audit were explained.

Part 2

The computer interactive portion of the experiment began with the subjects reviewing information provided in Part 1. Subjects were then given information regarding two new products, Products C and D, that had successfully passed the pre-production milestones. The subjects were asked to select one of the new products to add to the division's product line. Subjects were asked to make the initial product selection decision because prior research [Staw and Ross 1987] suggests that an initial decision is important for subject identification with the product. Products C and D offered the same expected return but had different variances. Thus, the initial product selection decision could serve as a measure of subjects' ex ante risk propensity.[10]

After making their initial product selection decision, subjects were told that Period 1 production was in process. At the end of the period, the Division Product Contribution Report to Corporate Headquarters was generated. Product costs

[10] Subject risk propensity was not considered as a specific determinant of escalation in this study. However, the ex ante (before negative feedback and escalation decision) risk propensity measure was assessed for possible use as a covariate to control for risk preferences. A t-test showed there were no differences in risk propensity between subjects who escalated and subjects who did not escalate ($t = -1.061$, $p < .291$). Therefore, the ex ante risk measure was not needed to control for risk preferences.

reflected in the report varied as would be the case in an actual situation depending on whether the subject was in the PAC or ABC condition. Subjects were given a hard copy of the report to review while making production decisions. In addition, those subjects who were selected by the auditor for an audit received the audit report shown in Table 4.4. The report stated that the manager's decisions appeared to be appropriate. Therefore, all subjects remained eligible for the bonus and the tournament.

TABLE 4.4

AUDIT REPORT

I obtained and reviewed financial information about production decision on Product A and Product B. Based on this review, both products met the target contribution margin percentage of 25%. Thus, the production decisions on Product A and on Product B appear to have been appropriate.

While your division did start producing a new product during the period, I did not review any information about this product. It is corporate policy not to audit decisions associated with new products in the first year of the product's life. However, future decisions associated with the new product will be evaluated in future audits.

Thus, based upon my review, it appears that your decisions as division manager were appropriate.

Connie Esmond
Internal Audit Department
Midwest Automotive Products

After reviewing the Division Product Contribution Report, subjects were told that corporate headquarters would like them

to set target production levels for Product A and Product B for Period 2 and were asked to select a production level from several alternatives. Before they were asked whether they would continue funding the new product in Period 2 and for their confidence in their response regarding continuing to fund the new product, subjects were given the opportunity to review financial information on the new product. The information was summarized in the New Product Cost Information report which indicated that actual production engineering costs for the new product were significantly higher than budgeted. This cost report was the same for all subjects regardless of which product a subject selected or in which cell a subject was assigned.

Part 3

The third part of the experiment began with an ex post risk propensity measures which was similar to one used by Ruchala [1991] which was taken from MacCrimmon and Wehrung [1984].[11] The measure required subjects to either settle a patent violation out of court (sure loss) or to continue a lawsuit. This risk measure was used to stratify the subjects according to their risk propensities to determine if risk

[11] Prior research [Ruchala, 1991] indicates that a cognitive shift in risk seeking behavior on the part of an agent may occur when negative feedback is received which is related to a reference point such as a budget target. Therefore, the ex post measure was used to assess whether negative feedback results in some agents becoming more risk seeking.

interacted with the degree of information asymmetry, compensation scheme, and/or the threat of detection.

Subjects were then asked to wait while second period production was in process. The Division Product Contribution Report was then generated for subject review and transmission to corporate headquarters.

Part 4

After reviewing and transmitting the Division Contribution Margin Report, subjects were told there was insufficient time to complete another period and were asked to wait while their decisions were being processed by the computer. While waiting, subjects were given an on-screen exit questionnaire which contained experimental and manipulation check items. They were also asked to provide background information concerning their gender, age, education level, major, grade point average, and work experience.

All subjects were told there was insufficient time to complete the audits for the period and that eligibility for the special bonus was based on completed production periods. Subjects were then compensated for their participation. In addition, all subjects under the small tournament incentive were eligible for the $5 tournament and all subjects under the large tournament incentive were eligible for the $50 tournament. The tournament bonuses were awarded after all experimental sessions were completed.

4.5 Pre-Test and Pilot Study

A preliminary test of the experiment was conducted using seven Ph.D. students and five undergraduate students. The objective of the pre-test was to test the clarity of the instrument and the experimental manipulations prior to developing the interactive computerized instrument. Since the experimental task was understood by the subjects and the manipulations appeared to be valid, the test instrument was programmed for a pilot test.

A pilot study using four MBA and twenty-five undergraduate students was conducted to test the computerized test instrument and to evaluate whether the subjects comprehended and responded to the manipulations. As a result, the audit manipulation was strengthened by having only one individual portray the auditor in all experimental sessions. In addition, the auditor rather than the experimenter presented the company's internal audit policy and gave examples of inappropriate decisions. Other minor revisions were made to the manipulation check questions in order to better assess the subjects' responses to the manipulations.

CHAPTER 5

ANALYSIS AND RESULTS

5.1 Experimental Subjects

Both undergraduate and MBA students were solicited to obtain volunteers for each of the eight experimental conditions. A total of 124 students participated as shown in Table 5.1. Demographic data are summarized in Table 5.2. As expected, the undergraduate and MBA students varied on age, grade point average, work experience and the number of projects previously managed (see Table 5.3). However, there were no significant difference in coursework in escalation and/or sunk costs between the undergraduate and MBA students.

TABLE 5.1

PARTICIPANTS BY EXPERIMENTAL CONDITION

	DEGREE OF INFORMATION ASYMMETRY	
	PAC	ABC
SMALL TOURNAMENT INCENTIVE		
LOW THREAT OF AUDIT	15	15
HIGH THREAT OF AUDIT	16	16
LARGE TOURNAMENT INCENTIVE		
LOW THREAT OF AUDIT	16	16
HIGH THREAT OF AUDIT	15	15

TABLE 5.2

DEMOGRAPHIC DATA

GRADE LEVEL	
UNDERGRADS	82
MBA	42
GENDER	
MALE	86
FEMALE	38
AGE	
MEAN	23.23
STD DEV	3.09
PROJECTS MANAGED	
MEAN	1.61
STD DEV	.95

MAJOR	
ACCOUNTING	86
FINANCE	51
OTHER	10
COURSEWORK IN ESCALATION	
YES	109
NO	15
GRADE POINT AVERAGE	
MEAN	1.80
STD DEV	.70
WORK EXPERIENCE	
MEAN	2.44
STD DEV	1.39

GPA
1 = 3.51 TO 4.00
2 = 3.01 TO 3.50
3 = 2.51 TO 3.00
4 = BELOW 2.50

PROJECTS MANAGED
1 = NO PROJECTS MANAGED
2 = 1 TO 5 PROJECTS
3 = 6 TO 10 PROJECTS
4 = MORE THAN 10 PROJECTS

WORK EXPERIENCE
1 = NO WORK EXPERIENCE
2 = LESS THAN 1 YEAR
3 = 1 TO 2 YEARS
4 = 3 TO 4 YEARS
5 = 5 OR MORE YEARS

TABLE 5.3

UNDERGRADUATES VERSUS MBA STUDENTS

	UNDERGRADUATES	MBAs	SIGNIFICANCE
AGE	21.439	26.714	.000
GPA	2.012	1.381	.000
COURSEWORK	1.146	1.070	.226
WORK EXP	1.768	2.429	.000
PROJECTS	1.195	2.429	.000

GPA
1 = 3.51 TO 4.00
2 = 3.01 TO 3.50
3 = 2.51 TO 3.00
4 = BELOW 2.5

PROJECTS MANAGED
1 = NO PROJECTS MANAGED
2 = 1 TO 5 PROJECTS
3 = 6 TO 10 PROJECTS
4 = MORE THAN 10 PROJECTS

COURSEWORK IN ESCALATION
1 = YES 2 = NO

WORK EXPERIENCE
1 = NO WORK EXPERIENCE
2 = LESS THAN 1 YEAR
3 = 1 TO 2 YEARS
4 = 3 TO 4 YEARS
5 = 5 OR MORE YEARS

5.2 Tests for Randomization of Subjects

During the computer exercise, subjects provided demographic data which was collected in the data file created by the computerized test instrument. Two-sample t-tests are conducted on several demographic variables for each of the main effects. The results are presented in Tables 5.4 through 5.6. There was no significant differences in gender, age, number of projects managed, and work experience between the levels of the factors. Therefore, there appears to be sufficient randomization of subjects.

TABLE 5.4

INFORMATION ASYMMETRY
RANDOMIZATION CHECK

	PAC CONDITION	ABC CONDITION	t-TEST p VALUE
GENDER			
MEAN	1.290	1.322	
STANDARD DEVIATION	.458	.471	.700
AGE			
MEAN	23.032	23.419	
STANDARD DEVIATION	2.840	3.327	.487
NUMBER OF PROJECTS MANAGED			
MEAN	1.645	1.581	
STANDARD DEVIATION	.960	.950	.707
WORK EXPERIENCE			
MEAN	2.371	2.500	
STANDARD DEVIATION	1.283	1.490	.606

GENDER
1 = MALE
2 = FEMALE

PROJECTS MANAGED
1 = NO PROJECTS MANAGED
2 = 1 TO 5 PROJECTS
3 = 6 TO 10 PROJECTS
4 = MORE THAN 10 PROJECTS

WORK EXPERIENCE
1 = NO WORK EXPERIENCE
2 = LESS THAN 1 YEAR
3 = 1 TO 2 YEARS
4 = 3 TO 4 YEARS
5 = 5 OR MORE YEARS

TABLE 5.5

COMPENSATION SCHEMES
RANDOMIZATION CHECK

	SMALL TOURNAMENT	LARGE TOURNAMENT	t-TEST p VALUE
GENDER			
MEAN	1.307	1.307	
STANDARD DEVIATION	.465	.465	1.000
AGE			
MEAN	23.307	23.145	
STANDARD DEVIATION	3.134	3.061	.772
NUMBER OF PROJECTS MANAGED			
MEAN	1.516	1.710	
STANDARD DEVIATION	.825	1.062	.259
WORK EXPERIENCE			
MEAN	2.387	2.484	
STANDARD DEVIATION	1.418	1.364	.699

GENDER
1 = MALE
2 = FEMALE

PROJECTS MANAGED
1 = NO PROJECTS MANAGED
2 = 1 TO 5 PROJECTS
3 = 6 TO 10 PROJECTS
4 = MORE THAN 10 PROJECTS

WORK EXPERIENCE
1 = NO WORK EXPERIENCE
2 = LESS THAN 1 YEAR
3 = 1 TO 2 YEARS
4 = 3 TO 4 YEARS
5 = 5 OR MORE YEARS

TABLE 5.6

THREAT OF DETECTION
RANDOMIZATION CHECK

	LOW THREAT	HIGH THREAT	t-TEST p VALUE
GENDER			
MEAN	1.339	1.274	
STANDARD DEVIATION	.447	.450	.440
AGE			
MEAN	22.774	23.677	
STANDARD DEVIATION	2.983	3.146	.103
NUMBER OF PROJECTS MANAGED			
MEAN	1.548	1.677	
STANDARD DEVIATION	.881	1.021	.453
WORK EXPERIENCE			
MEAN	2.258	2.613	
STANDARD DEVIATION	1.342	1.418	.155

GENDER
1 = MALE
2 = FEMALE

PROJECTS MANAGED
1 = NO PROJECTS MANAGED
2 = 1 TO 5 PROJECTS
3 = 6 TO 10 PROJECTS
4 = MORE THAN 10 PROJECTS

WORK EXPERIENCE
1 = NO WORK EXPERIENCE
2 = LESS THAN 1 YEAR
3 = 1 TO 2 YEARS
4 = 3 TO 4 YEARS
5 = 5 OR MORE YEARS

5.3 Manipulation Checks

Manipulation checks were conducted on each of the three factors to determine whether the subjects perceived a difference in the experimental conditions. The scale used ranged from 1, "strongly agree" to 7, "strongly disagree." For degree of information asymmetry, the statement used was "Information I received from my subordinates about the profitability of the new product was different from the information reported in the corporate accounting system about the profitability of the new product." Those in the ABC condition (mean = 3.919) received division reports with the same information as that provided by subordinates; while those in the PAC condition (mean = 4.145) had a majority of the overhead costs associated with the new product allocated to other division products. The difference in the responses between the two conditions was not statistically significant ($t = .874$, one-tail $p < .192$).

One possible explanation for this finding is that subjects in the ABC information asymmetry condition seemed to focus on the production engineering problem more than those in the PAC condition which could have affected the manipulation. When asked to allocate 100 points across several information items to indicate which was the most important, the ABC group allocated an average of 24 points to the explanation of the production engineering problem while those in the PAC group only allocated an average of 16 points ($t = -2.38$, two-tail p

< .019). This would not be unusual since the ABC group had the production engineering problem made more salient by the low product contribution margin shown for the new product in the Division Contribution Margin Report.

The manipulation check for compensation scheme used the statement "The amount of the special bonus which will be paid to one manager at the end of this project is small compared to what I expect to be paid today." Subjects had been told they would receive a minimum of $6 for their participation. The subjects in the low tournament ($5) group (mean = 4.274) were more likely than those in the large tournament ($50) group (mean = 5.823) to consider the tournament bonus small compared to their expected compensation for their performance on the computer exercise (t = -5.738, one-tail p = .000).

The three manipulation checks for the threat of detection are summarized in Table 5.7. The first manipulation check was an objective statement and the second was a subjective statement to determine whether subjects in the low and high audit conditions perceived a difference in their chances of being audited. Both statements resulted in significant differences indicating that the subjects perceived a difference in their chances of being audited. A third statement asked whether the chance of an audit had a large effect on subjects' decisions to continue the new product. On a scale of 1 to 7 with 1 being strongly agree, the mean for the low audit condition was 4.84 and for the high audit

condition was 4.47 (t =1.058, one-tail p < .138). Potential explanations for this result are discussed in Section 5.5.

TABLE 5.7

MANIPULATION CHECKS
(1=STRONGLY AGREE; 7=STRONGLY DISAGREE)

THREAT OF DETECTION

(1) The chances of my being audited were less than 20% each period.

	CASES	MEAN	STD DEV	MIN	MAX
Low Audit	62	1.919	1.485	1	7
High Audit	62	6.194	1.377	1	7
t-Value = -16.615			One-tail p = .000		

(2) I thought the chances of my being audited were high.

	CASES	MEAN	STD DEV	MIN	MAX
Low Audit	62	5.403	1.207	2	7
High Audit	62	3.500	1.544	1	7
t-Value = 7.645			One-tail p = .000		

(3) The chance of an audit had a large affect on my decision about whether to continue the new product into the second period of production.

	CASES	MEAN	STD DEV	MIN	MAX
Low Audit	62	4.839	1.943	1	7
High Audit	62	4.468	1.826	1	7
t=Value = 1.058			One-tail p < .138		

Several statements which were used to assess the validity of the test instrument are shown in Table 5.8. While responses ranged from strongly agree to strongly disagree, the subjects generally appeared to have taken the exercise seriously, found the instructions to be clear, found the tasks believable, and put a lot of thought into their decisions.

TABLE 5.8

TEST INSTRUMENT CHECKS
(1=STRONGLY AGREE; 7=STRONGLY DISAGREE)

		MEAN	STD DEV	MIN	MAX
1.	I took this exercise seriously.	1.895	1.529	1	7
2.	I thought the instructions were clear.	1.919	1.214	1	7
3.	I found the tasks in this exercise to be believable.	2.347	1.119	1	7
4.	I put a lot of thought into the decisions I made.	2.008	1.024	1	7

5.4 Testing of Hypotheses

It was expected that subjects would escalate more under PAC than under ABC (H_1); that subjects would escalate more with a large tournament incentive than a small tournament incentive (H_2); and that subjects would escalate more with a low threat of detection than with a high threat of detection (H_3). The hypotheses which are summarized in Table 5.9 were tested using two different dependent variables - the subject's decision on whether to continue funding the new product and the subject's confidence in that decision. Descriptive statistics for the decision to continue variable which consists of the subject's yes/no responses on whether they would continue funding the new product are shown in Table 5.10.

TABLE 5.9

HYPOTHESES

DEGREE OF INFORMATION ASYMMETRY

H_1: *Ceteris paribus*, agents are more likely to escalate with a higher degree of information asymmetry between principal and agent (i.e., under PAC) than with a lower degree of information asymmetry between principal and agent (i.e., under ABC).

COMPENSATION SCHEMES

H_2: *Ceteris paribus*, agents are more likely to escalate if the compensation scheme includes a relatively large tournament incentive than if the compensation scheme includes a relatively small tournament incentive.

THREAT OF DETECTION

H_3: *Ceteris paribus*, agents are more likely to escalate with a low threat of detection than a high threat of detection.

TABLE 5.10

DESCRIPTIVE STATISTICS - CONTINUE VARIABLE

	PAC			ABC		
	ESCALATION			ESCALATION		
	YES	NO	TOTAL	YES	NO	TOTAL
SMALL TOURNAMENT						
LOW THREAT						
n	14	1	15	4	11	15
HIGH THREAT						
n	15	1	16	6	10	16
LARGE TOURNAMENT						
LOW THREAT						
n	11	5	16	6	10	16
HIGH DETECTION						
n	9	6	15	4	11	15

The continue variable is a dichotomous measure and is tested using chi-square nonparametric tests. Results of the chi-square tests shown in Table 5.11 support hypothesis 1. The result for compensation scheme is statistically significant but not in the direction hypothesized. Hypothesis 3 for threat of detection is not supported.

TABLE 5.11

CHI-SQUARE TESTS - CONTINUE VARIABLE

INFORMATION ASYMMETRY (H_1)

	ESCALATION		
	YES	NO	TOTAL
PAC	49	13	62
ABC	20	42	62
TOTALS	69	55	124

PEARSON COEFFICIENT 27.479 One-Tail p = .000

COMPENSATION SCHEME (H_2)

	ESCALATION		
	YES	NO	TOTAL
LOW TOURNAMENT	39	23	62
HIGH TOURNAMENT	30	32	62
TOTALS	69	54	124

PEARSON COEFFICIENT 2.647 One-Tail p < .052

THREAT OF DETECTION (H_3)

	ESCALATION		
	YES	NO	TOTAL
LOW AUDIT (10%)	35	27	62
HIGH AUDIT (40%)	34	28	62
TOTALS	69	55	124

PEARSON COEFFICIENT .033 One-Tail p < .429

Descriptive statistics for the measure of the subjects' confidence in their decisions (scale of 0 to 9 with those who did not continue being multiplied by -1) are shown in Table 5.12. Multiplying the responses of the subjects who answered "no" to continuing the product by -1 resulted in a continuous scale from -9 to +9 of escalation behavior. The confidence measure is analyzed using ANOVA[12], and the results presented in Table 5.13 are consistent with the chi-square results for the continue variable. The results indicate that the main effect for information asymmetry is significant ($t = 7.119$, one-tail $p = .000$). The main effect for the compensation scheme is significant ($t = 1.547$, one-tail $p < .063$), but not in the direction hypothesized. This is consistent with the results from the dichotomous measure of escalation.

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[12] The assumptions of ANOVA are (1) data in each cell are normally distributed, and (2) homogeneity of variance across cells. A non-parametric runs test indicated that the data are random using mean ($Z = -1.500$, two-tail $p < .134$) and median ($Z = -1.239$, two-tail $p < .215$). However, Kolmogorov-Smirnov tests indicate that the data violate the normality assumption. Bartlett-Box F which tests whether the variances in each cell are equal indicates that he assumption of homogeneity of variance is also violated. Although the results from ANOVA are typically robust for moderate departures from normality or for moderate violations of homogeneity of variance, the data are also analyzed using nonparametric statistical tests. The results of individual Mann-Whitney tests were qualitatively similar for the main effects. Thus, violations of the homogeneity of variance assumption does not appear to drive the ANOVA results.

TABLE 5.12

DESCRIPTIVE STATISTICS - CONFIDENCE VARIABLE

	PAC			ABC		
	ESCALATION			ESCALATION		
	YES	NO	TOTAL	YES	NO	TOTAL
SMALL TOURNAMENT						
LOW THREAT						
n	14	1	15	4	11	15
Mean	6.643	-4.000	5.933	5.500	-7.000	-3.667
Std Dev	1.001	--	2.915	1.915	1.265	5.888
HIGH THREAT						
n	15	1	16	6	10	16
Mean	7.000	-7.000	6.125	3.833	-7.700	-3.375
Std Dev	1.604	--	3.828	1.941	.949	5.920
LARGE TOURNAMENT						
LOW THREAT						
n	11	5	16	6	10	16
Mean	7.000	-6.800	2.688	4.833	-7.400	-2.813
Std Dev	.447	1.304	6.651	1.169	1.075	6.210
HIGH DETECTION						
n	9	6	15	4	11	15
Mean	7.333	-6.500	1.800	6.750	-6.636	-3.067
Std Dev	1.323	1.049	7.113	.957	1.629	6.296

TABLE 5.13

ANOVA
CONFIDENCE VARIABLE

SOURCE	SSE	DF	MSE	F	t	p*
INFORMATION (I)	1684.266	1	1684.266	50.681	7.119	.000
COMPENSATION (C)	79.484	1	79.484	2.393	1.547	.063
DETECTION (D)	.839	1	.839	.025	.158	.437
I*C	147.622	1	147.622	4.442	2.108	.019
I*D	1.041	1	1.041	.031	.176	.430
C*D	5.111	1	5.111	.154	.392	.348
I*C*D	.511	1	.511	.017	.130	.449
RESIDUAL	3854.975	116	33.233			
TOTAL	5772.798	123	46.933			

*one-tail p values

The interaction between information asymmetry and compensation scheme is statistically significant ($t = 2.108$, $p < .019$). Therefore, in an attempt to better understand the interaction, tests of the simple main effects of information asymmetry and compensation scheme were conducted. The simple main effects for the confidence measure of escalation results in information asymmetry being significant at both levels of compensation scheme (at small tournament, $t = 6.514$, $p = .000$; at large tournament, $t = 3.543$, $p = .000$). This is consistent with the main effect for information asymmetry.

However, when testing the simple main effects of compensation scheme at the two levels of information asymmetry, different results are found at each level. While compensation scheme at the ABC level is not significant ($t=.396$), compensation scheme at the PAC level of information asymmetry is significant ($t= 2.575$, $p < .01$), but in the opposite direction of what is hypothesized. Subjects in both the PAC level of information asymmetry and the relatively large tournament incentive were less likely to escalate than those in the PAC and small tournament group. This anomalous finding, as well as the main effects, are discussed in the next section.

The negative feedback associated with the new product that the subjects selected for production could have increased subjects' risk propensities resulting in increased escalation behavior [Ruchala, 1991]. Therefore, an exploratory analysis

using the ex ante risk propensity measure (based on riskiness of the product selected for production) and an ex post risk propensity measure (based on whether subject recommended settling or going to court on the lawsuit) was conducted to determine if the subjects' willingness to take risks was affected by the receipt of negative feedback. The correlation between the ex ante and ex post measures was not significant ($r = -.1304$) and a paired t-test was significant (t-value = 5.16, two-tail p = .000). Therefore, there is support for a shift in the subjects' risk propensities. However, when the risk measures were used as covariates in the ANOVA, they were not significant and there were virtually no changes in the results previously reported.

5.5 Discussion of Results

This section summarizes the results of the hypothesis tests and discusses possible rationale for the seemingly anomalous result of the simple main effects test of compensation scheme at the PAC level of information asymmetry. Test results for the first hypothesis concerning information asymmetry suggest that when more accurate information is reported to the principal, the agent is less likely to escalate. However, with less accurate information or a higher degree of information asymmetry, the principal is less likely to be aware of escalation behavior and escalation behavior is more prevalent.

The main effect of the second hypothesis concerning the compensation scheme was significant in the direction opposite to that hypothesized. During the exit briefing, several students who were under the ABC level of information asymmetry stated that the decision to escalate was such an obviously poor choice that the tournament incentive was ineffective. As shown in Table 5.14, only 20 of 62 subjects in the ABC level of information asymmetry escalated. By comparison, 49 of 62 subjects in the PAC level escalated. It appears that the tournament incentive was only effective at the PAC level of information asymmetry. However, the effect is opposite of that hypothesized. Examining the simple main effects for compensation scheme at the PAC level also resulted in the seemingly anomalous result showing that at the PAC level the exact opposite of what is hypothesized occurs. The large tournament did not induce more escalation behavior than the small tournament. Instead, there was more escalation at the PAC level and small tournament incentive than at the PAC level and large tournament incentive.

Several subjects in the large tournament level indicated they felt they would not win the tournament incentive in any event. In effect, winning the large tournament incentive was viewed as a random occurrence rather than as part of their compensation. Therefore, these subjects' decisions did not reflect expected value consideration and were not economically rational. Further evidence of cognitive bias consists of

subjects' responses when asked to allocate 100 points across several statements reflecting possible meanings of the term "appropriate decision." For the statement "One that was the best for the firm as a whole", the average points allocated by the high tournament group (27.7) was significantly higher than the points allocated by the low tournament group (23.0). This suggests that the subjects in the large tournament group were more inclined to behave in the best interests of the principal than those in the low tournament group. However, both groups received the same instructions.

Table 5.14

DECISIONS BY INFORMATION ASYMMETRY AND COMPENSATION SCHEME

	ESCALATION	
	YES	NO
ABC		
Small Tournament	10	21
Large Tournament	10	21
	20	42
PAC		
Small Tournament	29	2
Large Tournament	20	11
	49	13

The threat of detection hypothesis was not significant. According to the manipulation check, the probability of an audit did not affect the subjects' decision on whether to continue the new product. The subjects may not have been willing to admit that the possibility of detection affected

their decisions. However, an insight into this result can be gained by analyzing subjects responses when asked to allocate 100 points across several statements of what the term "appropriate decision" meant to them in terms of the audit. The average of the points allocated by the subjects were as follows: (1) 37 points to the statement "One that maximized my division contribution margin", (2) 20 points to "One that would maximize my compensation", (3) 25 points to "One that was the best for the firm as a whole", and (4) 17 points to "One that had the least risk associated with it." While the audit was described in terms of what was best from the standpoint of the firm, there was obviously some disagreement on what an appropriate decision meant.

In addition, the audit may have been only a poor substitute for the ABC level of information asymmetry. Under ABC, the information alone, without an audit, was sufficient for the principal to detect escalation behavior. In the ABC report submitted to the principal, the new product had a very low contribution margin percentage. Therefore, it is likely the audit was not an effective threat of detection for subjects in the ABC condition.

Another possible rationale is that the audit was not taken seriously by students due to lack of experience. An indication of this is that while the manipulation check of whether the chance of an audit had a large affect on the subject's decision on whether to escalate is not significant

($p < .138$), it was significant for only the MBA students ($p < .008$). MBA students had significantly more work experience and had managed significantly more projects than undergraduates. Therefore, it is possible that the laboratory experiment using a majority of undergraduates did not adequately capture the audit manipulation.

CHAPTER 6

CONCLUSIONS

6.1 Summary and Implications

The objective of this research was to investigate the effects of several agency theory variables on escalation. Three hypotheses were developed to predict the effect of information asymmetry, compensation scheme, and threat of detection on an agent's propensity to escalate. These hypotheses were empirically tested in a laboratory experiment using an interactive computer exercise.

The first hypothesis predicted that agents are more likely to escalate with a higher degree of information asymmetry between the principal and agent than with a lower degree of information asymmetry. The empirical results support this hypothesis. Escalation was positively associated with an increased degree of information asymmetry between the principal and agent.

The findings for the second hypothesis were opposite of what was hypothesized. The hypothesis predicted that agents are more likely to escalate if the compensation scheme includes a relatively large tournament incentive rather than a relatively small tournament incentive. Several subjects indicated that winning the large tournament was viewed as a

random occurrence rather than as part of their compensation. Therefore, these subjects' decisions were not based on economic criteria. In addition, the significant interaction between degree of information asymmetry and compensation scheme indicates that the ABC reporting system may have been driving subjects' decisions not to escalate.

The ABC reporting system also may have affected the threat of detection manipulation. The hypothesis which predicted that agents are more likely to escalate with a low threat than a high threat of detection was not supported. However, the threat of detection may have only been a poor substitute for the ABC reporting system. Apparently, in the minds of the subjects, ABC information alone, without an audit, was sufficient for the principal to detect escalation behavior.

6.2 Limitations

While testing escalation in an accounting context extends the literature on escalation, there are several limitations to this research. Although using a laboratory experiment increased control, measurability, and internal validity, it required a simplified production setting rather than a field environment. In a field environment, other factors such as performance evaluations, goal commitment, and production constraints, would influence any findings involving multi-period production.

This research also used student subjects which reduces the ability to generalize to managers operating in field settings. However, upper level undergraduate and MBA students were selected to reduce the drawbacks of using student subjects. In addition, the production task used in the experiment matched subjects' level of expertise.

6.3 Future Research Directions

This research examined only three determinates of escalation and only one simplified escalation situation. Other information systems, compensation schemes, and/or threats of detection might be preferable in escalation situations with a large amount of uncertainty in outcomes over a long period of time. Several modifications to this experiment could address the problems and limitations discussed in the previous subsections. First of all, if an audit is used as a threat of detection manipulation, the information gathered in an audit should be different from what is reported in the accounting system.

Secondly, an alternative compensation manipulation which is more economically rational to the subjects is suggested. Keeping the amount of the tournament incentive constant across levels of the compensation scheme and increase the probability of winning the tournament at each level might be more effective. This could possibly reduce the number of escalation decisions which were not economically rational.

Finally, a theory that explains escalation based on limited economic rationality and further research that focuses on both economic and behavioral determinates of escalation are needed. Future research should be conducted in the field where operational decisions involve ongoing products or multi-period projects which are incrementally funded.

APPENDIX A

Work-in-Process Under PAC and ABC

Work-in-process (WIP) inventory consists of manufactured products that are only partially completed at the end of an accounting period. A debit to the work-in-process inventory account increases the cost-based value of the unfinished product. Debits include direct material, direct labor, and manufacturing overhead.

Consider a manufacturing operation in which a set-up for a production run costs $10,000 which is comprised of indirect labor, certain materials, and engineering costs. Two products are produced of which Product A is an established product at full production and Product B is a new product requiring frequent set-ups. In established production lines, low volume products would typically be produced in batches which minimize set-up costs. However, new products often have prototype production runs. Therefore, new products can result in increased set-up costs due to the need to ramp-up and/or make production changes. Summary information by product is provided below:

	Established Product A	New Product B
Partial Units in WIP	100,000	20,000
# of Production Set-Ups	2	4
Units Run per Set-Up	50,000	5,000

Under traditional PAC reporting, total set-up costs of $60,000 ($10,000 each for 6 set-ups) would be allocated to each unit of products A and B equally. Therefore, each of the 120,000 units in WIP (Products A and B combined) would be allocated $ .50 in set-up costs. The debits in the WIP account for set-up costs for Products A and B would be as follows:

		WIP A
Product A	100,000 * .50	50,000

		WIP B
Product B	20,000 * .50	10,000

Under ABC reporting, costs are charged to the WIP inventory accounts of the specific products which incurred the costs. The debits in the WIP accounts for set-up costs for Products A and B would be as follows:

		WIP A
Product A	2 runs * 10,000	20,000

		WIP B
Product B	4 runs * 10,000	40,000

While total set-up costs are accounted for under both costing methods, product cost information for specific products is distorted under PAC reporting. PAC results in Product A, which has a higher volume, "subsidizing" Product B. However, ABC directly traces costs to the products which caused the costs to be incurred. The set-up costs in the WIP accounts for each product under PAC and ABC are summarized below.

	PRODUCT A	PRODUCT B	TOTALS
PAC	50,000	10,000	60,000
ABC	20,000	40,000	60,000
DIFFERENCE	30,000	-30,000	0

APPENDIX B

EXPERIMENTAL MATERIALS

Human Subjects Consent Form

Instructions and Introduction

Background role-playing information is provided and sample cost reports are shown to the subjects. In addition, subject compensation and the probability of an audit are explained.

Text of Computerized Test Instrument

First Production Period: Subjects select a new product for production; performance feedback is provided in the form of a division cost report on first period production; and subjects make production decisions.

Second Production Period: Subjects are given a memo on a threatened lawsuit as a risk propensity measure and performance feedback is provided in the form of a division cost report on second period production.

Exit Questionnaire: Subjects are asked to answer on screen questions while their decisions are being processed by the computer and their amount of compensation is determined.

Payment and Debriefing: Subjects are paid for their participation and scheduled for a debriefing on the experiment.

INFORMED CONSENT FORM

INFORMATION
You are invited to participate in a research study. The purpose of this study is to examine decisions typical of many managerial work situations.

PROCEDURE
Following an introduction, you will use the computer to complete this exercise. You will be asked to play the role of a division manager in a large corporation. In that role, you will make periodic production decisions regarding products manufactured by your division. The exercise should take about one hour to complete. The results generated by this study will be used to provide a better understanding of how managers make decisions.

CONFIDENTIALITY
The information in the study will be kept confidential. Data will be stored in a locked cabinet and will be made available only to persons conducting the study unless you specifically give permission in writing to do otherwise. No reference will be made in verbal or written reports which could link you to the study.

COMPENSATION
Your pay for participating in this task will depend upon the outcomes of your decisions. However, you will receive at least $6. One student will receive a bonus of $5 ($50) which will be paid in approximately 1 week. If you withdraw from the study prior to its completion, you will not receive any money and will not be eligible for the bonus.

CONTACT
If you have questions at any time about the study or the procedures, you may contact the researcher, LaRita M. Decker, BU 540, 855-8966.

PARTICIPATION
Your participation in this study is voluntary, you may decline to participate. If you decide to participate, you may withdraw from the study at anytime. If you withdraw from the study prior to its completion your data will be destroyed.

SIGNATURE
I have read and understand the above information. I have received a copy of this form. I agree to participate in this study.

Subject's signature_____ Date_____

Investigator's signature_____ Date_____

INSTRUCTIONS

Please do not discuss your strategy or performance with other participants during the course of this exercise.

Parts of these instructions are complex. Since you must understand these instructions to perform the exercise, please ask any and all questions that you have regarding the material presented.

INTRODUCTION

This exercise replicates certain production decisions made by division managers. In this exercise, you are to assume the position of a division manager for Midwest Automotive Products (MAP) which manufactures automotive components. As division manager, you are responsible for the products produced and for the amount of profit generated by your division. Your division currently produces two similar electronics products, Product A and Product B.

The exercise consists of 3 stages which are summarized below.

Overview

STAGE 1:

Stage 1 provides an orientation to the company. We will read a description of the company's organizational structure and your general responsibilities. You will also see a sample division cost report which is generated by the accounting system and shows the profitability of the products produced in your division. Your compensation, which is partially based on profitability, will also be explained.

STAGE 2:

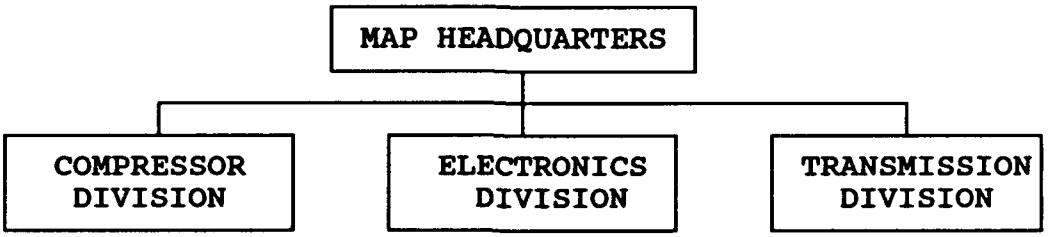
Stage 2 explains the production decisions you will be making as division manager.

STAGE 3:

Stage 3 consists of the computer exercise. Through an interactive program, you will experience several production periods. The amount you earn will be computed each period and paid to you at the end of the exercise.

STAGE 1:

CORPORATE STRUCTURE: MAP manufactures automotive components for one of the big three auto makers. The company is located in Madison, Wisconsin and consists of three main plants at different geographic locations. Each plant is a separate division of MAP. The organizational structure is summarized below:



You are the manager of the Electronics Division. The decisions you make during the production periods in this exercise will be recorded on the computer so that the effects of your decisions can be determined immediately. When you are making your decisions, you can assume that your division has very qualified personnel, is well managed, and your staff will do their best to carry out any actions you decide to take.

CORPORATE ACCOUNTING SYSTEM: The corporate accounting system collects sales and expenses separately for each division. You are responsible for the profitability of each product in your division and for the division as a whole. The accounting system computes profitability as a percentage of sales which is the *contribution margin percentage*.

At the end of each production period, the corporate accounting system generates a report for your division called the Division Product Contribution Report to Headquarters. The report is automatically generated and is provided to you for your review. It contains sales and expenses for each product in your division and shows profitability by individual product as well as for the division. Also shown is the contribution margin percentage achieved by each product and for your division as a whole. MAP headquarters relies heavily on the Division Product Contribution Report in assessing product profitability and in awarding managers for superior performance. MAP expects its division managers to achieve a target *division contribution margin percentage* of at least 25% and awards those who do. A sample Division Product Contribution Report is shown on the next page.

DIVISION PRODUCT CONTRIBUTION REPORT
TO HEADQUARTERS
(In Thousands)

	PRODUCT A	PRODUCT B	DIVISION TOTAL
Sales	$1,100	$ 800	$1,900
Raw Materials	200	180	380
Labor	250	210	460
Manufacturing Overhead	100	80	180
Mfg Contribution Margin	550	330	880
Mfg Contribution %	50.0%	41.3%	46.3%
Less Other Expenses			
Marketing	60	60	120
Distribution	30	30	60
Administration	50	50	100
Production Contribution	410	190	600
Product Contribution %	37.3%	23.8%	31.6%
Less Division Expenses			100
Division Contribution			500
Division Contribution %			26.3%

Sales and expenses consisting of manufacturing (includes raw materials, labor, and overhead), marketing, distribution, and administration are listed for each product and are used to compute the product contribution margin percentages - 37.3% for Product A and 23.8% for Product B. The division contribution margin is computed by adding sales and subtracting product expenses and division expenses. On this report, the division contribution margin percentage of 26.3% is greater than the target of 25% that is set by MAP Headquarters.

COMPENSATION: The compensation you earn for each period consists of a salary and a bonus which is based on the division contribution margin percentage. You will earn a salary of $2.00 in each production period regardless of your decisions. A bonus of $3 will be paid to you for each period that your division achieves a division contribution margin percentage of at least 25%. Therefore, each period in which your division contribution margin percentage is less than 25%, you will receive $2.00. For any period in which you achieve a division contribution margin percentage of at least 25%, you will receive $5.00.

To make sure that you understand how you will be paid, please review the Division Product Contribution Report shown below and answer the following question:

Based on the report shown below, I have earned a total of _____ this period.

DIVISION PRODUCT CONTRIBUTION REPORT
TO HEADQUARTERS
(In Thousands)

	PRODUCT A	PRODUCT B	DIVISION TOTAL
Sales	$1,100	$ 800	$1,900
Raw Materials	200	180	380
Labor	250	210	460
Manufacturing Overhead	100	80	180
Mfg Contribution Margin	550	330	880
Mfg Contribution %	50.0%	41.3%	46.3%
Less Other Expenses			
Marketing	70	70	140
Distribution	35	35	70
Administration	55	55	110
Production Contribution	390	170	560
Product Contribution %	35.5%	21.3%	29.5%
Less Division Expenses			100
Division Contribution			460
Division Contribution %			24.2%

$2.00 is correct. You have earned the base salary of $2.00. You have not earned the bonus of $3.00 since the division contribution margin percentage of 24.2% is less than 25%.

SPECIAL BONUS: In addition to the amount of compensation you earn during the production period, one manager will be paid a special bonus of $5.00 ($50.00) which will be paid after all subjects complete this project - in approximately two weeks. To be eligible for the special bonus, you must achieve a division contribution margin percentage of at least 25% in all production periods. All managers who are eligible for the special bonus will be included in a drawing with an equal chance of winning. To make sure you understand your eligibility for the special bonus, please answer the following questions:

Question 1:

You achieved division contribution margin percentages of 23.4%, 29.2% and 26.3% during three production periods. Are you eligible for the special bonus?_____

Question 2:

You achieved division contribution margin percentages of 26.2%, 28.1% and 25.0% during three production periods. Are you eligible for the special bonus?_____

Answer Question 1:

No, you are not eligible because you did not achieve a division contribution margin percentage of at least 25% in each production period.

Answer Question 2:

Yes, you are eligible because you achieved a division contribution margin percentage of at least 25% in each production period.

STAGE 2:

As Division Manager, you will be making three decisions regarding the products in your division. These are described below:

Decision 1: You will be selecting new products for your division to produce. Due to limited funding for new products, MAP Headquarters has delegated the responsibility for selecting new products to division managers. Prior to selection, feasible alternatives are provided to you by corporate research and development.

Decision 2: You are responsible for setting production levels for the existing products, Products A and B. You will be given several possible production levels for each product and asked to select one for the next period.

Decision 3: When a new product is selected for production, it is MAP policy that a minimal number of units be produced in the first production period. Additional funds are spent in future periods to increase production capacity for new products. Therefore, in addition to selecting new products, you must decide whether to continue funding the new products in later periods.

CORPORATE AUDITS

Division managers are subject to audits by MAP Headquarters. Audits are used to evaluate the quality of production decisions made by division managers. At this time I would like to introduce the company auditor, Ms. Connie Esmond. She will explain the company's internal audit policy and explain how it affects you as a division manager.

AUDITOR'S PRESENTATION

The audit I will conduct is designed to allow me to evaluate the quality of the decisions you make as a division manager. If I select you to be audited, I will be able to access through the computer network any detailed information that is available to you from your subordinates. The computer will not allow me to access this detailed information if you are not audited.

After obtaining and reviewing the detailed information, I will decide whether your decisions were appropriate or inappropriate. Two examples of inappropriate decisions would be:

1. Producing so many more units in a period than can be sold during that period, thereby resulting in that product generating a contribution margin percentage below 25%.

   Example on Board:

Product A	Product B	Division
27%	23%	25%

2. Continuing to fund a new product that is generating a contribution margin percentage below 25%.

   Example on Board:

Product A	Product B	New Product	Division
27%	28%	20%	25%

If I audit you, I will give you a copy of my audit report, which indicates whether I concluded that your decisions were appropriate or inappropriate. In addition, I will submit a copy of my audit report to corporate headquarters. Rita will explain to you in a little bit how corporate headquarters uses my audit report.

Approximately _____ (either 10% or 40%) of you will be audited each period. This means that I will audit _____ (number is based on probability of audit and the number of subjects present) of you each period. The audit process is independent across periods which means whether or not you were audited in one period does not affect your chance of being audited in the next period or in the period after that.

You may be wondering how you will know whether you are being audited. During the computer exercise, all of you will receive a message on your computer that I am conducting an audit. When I have completed the audit, the person(s) who were audited will receive my audit report. You will not know whether you were audited until you actually receive my audit report.

SUMMARY

As Ms. Esmond has stated, you will receive an audit report if you are audited. In the report, the auditor will classify your decisions as either appropriate or inappropriate. If your decisions are classified as appropriate, you will remain eligible for the bonus in the next period and for the special bonus. If your decisions are classified as inappropriate, you will not be eligible for the bonus in the next period (i.e., you will lose the chance to earn $3). In addition, you will not be eligible for the drawing for the special bonus (i.e., you will lose the chance to win $5 ($50)).

A summary sheet of important information is provided on the next page. Please turn on your computers and review the summary sheet. If you have any questions, please ask them at this time.

SUMMARY SHEET

COMPENSATION

You will be paid a salary of $2.00 in each production period. In addition, a bonus of $3.00 will be paid to you for each period that your division contribution margin percentage is at least 25%. Managers who achieve a bonus each period are eligible for a special bonus of $5 ($50) at the completion of the project.

AUDIT

There is a 10% (40%) chance that your division will be audited in any production period. If you are audited and your decisions are determined to be inappropriate, you will be ineligible for the bonus in the next period and for the special bonus at the end of the project.

DECISIONS

1. Select new products to produce from among alternatives provided to you.
2. Set production levels for established products.
3. Decide whether to continue funding new products in future periods.

COMPLETE TEXT OF COMPUTER EXPERIMENT

Screen 1:

Now that you have completed an orientation to the company, let's review the compensation you will receive since the decisions you make will affect this amount. Please review the Division Contribution Margin Report to Headquarters which is shown on the following screen and answer the question which follows.

Press RETURN to continue

Screen 2:

DIVISION PRODUCT CONTRIBUTION REPORT
TO HEADQUARTERS
(In Thousands)

	PRODUCT A	PRODUCT B	DIVISION TOTAL
Sales	$1,100	$ 800	$1,900
Raw Materials	200	180	380
Labor	250	210	460
Manufacturing Overhead	100	80	180
Mfg Contribution Margin	550	330	880
Mfg Contribution %	50.0%	41.3%	46.3%
Less Other Expenses			
Marketing	60	60	120
Distribution	30	30	60
Administration	50	50	100
Production Contribution	410	190	600
Product Contribution %	37.3%	23.8%	31.6%
Less Division Expenses			100
Division Contribution			500
Division Contribution %			26.3%

Press RETURN to continue

Screen 3:

Based on the report shown on the previous screen, I have earned a total of $ ___ this period.

Enter amount in dollars or
press PgUp to see previous screen

If 5 is typed, continue with Screen 4. If 5 is not typed, skip Screen 4 and continue with Screens 4a - 4e.

Screen 4:

Yes, $5 is correct. You have earned the base salary of $2 plus the bonus of $3 since the division contribution margin percentage of 26.3% was greater than 25%.

Press RETURN to continue

When RETURN is entered, go to Screen 5

Screen 4a:

No, __(subjects response)__ is not correct. You have earned $5 which is the base salary of $2 plus the bonus of $3 since the division contribution margin percentage of 26.3% was greater than 25%. To review another Division Contribution Margin Report press RETURN.

Screen 4b:

DIVISION PRODUCT CONTRIBUTION REPORT
TO HEADQUARTERS
(In Thousands)

	PRODUCT A	PRODUCT B	DIVISION TOTAL
Sales	$1,100	$ 800	$1,900
Raw Materials	200	180	380
Labor	250	210	460
Manufacturing Overhead	100	80	180
Mfg Contribution Margin	550	330	880
Mfg Contribution %	50.0%	41.3%	46.3%
Less Other Expenses			
Marketing	70	70	140
Distribution	35	35	70
Administration	60	60	120
Production Contribution	385	165	550
Product Contribution %	35.0%	20.6%	28.9%
Less Division Expenses			100
Division Contribution			450
Division Contribution %			23.7%

Press RETURN to continue

Screen 4c:

Based on the report shown on the previous screen, I have earned a total of $ ____ this period.

Enter amount in dollars or
press PgUp to see previous screen

If 2 is typed, continue with Screen 4d. If 2 is not typed, skip Screen 4d and continue with screen 4e.

Screen 4d:

Yes, $2 is correct. You have earned the base salary of $2. You have not earned the bonus of $3 since the division contribution margin percentage of 23.7% was less than 25%.

Press RETURN to continue

When RETURN is entered, go to Screen 5.

Screen 4e:

No, __(subjects response)__ is not correct. You have earned the base salary of $2. You have not earned the bonus of $3 since the division contribution margin percentage of 23.7% is less than 25%. Please review the compensation section of the summary sheet at this time.

Press RETURN to continue

Screen 5:

You achieved division contribution margin percentages of 26.2% 25.0% and 29.6% during three production periods, are you eligible for the special bonus?_____

Please enter Yes or No

If Y is typed, continue with Screen 6a. If N is typed, go to screen 6b.

Screen 6a:

Yes, you are eligible because you achieved a division contribution margin percentage of at least 25% in each production period.

Press RETURN to continue

When RETURN is entered, go to Screen 7.

Screen 6b:

Yes, you are eligible because you achieved a division contribution margin percentage of at least 25% in each production period. Please review the compensation section of the summary sheet at this time.

Press RETURN to continue

Screen 7:

Please type "Go" to begin the
first period of operations

Period 1 begins when subject types "Go". Start clock to time subject.

Screen 8:

MAP headquarters has approved 2 new products for your division, Product C and Product D. MAP chose these products because they were recommended by the company's Research and Development department and are expected to meet future customer demand. MAP has only enough money to fund one of the new products in your division. Therefore, your first decision will be to decide which one to produce.

Profit projections on the two alternatives have been provided to you by the director of marketing. If you produce Product C, there is a 60% chance of generating profits of $60 million over the life of the product. However, there is a 40% probability of generating a loss of $15 million. Product D has a 75% probability of generating profits of $50 million over the life of the product and a 25% chance of generating a loss of $30 million. The following table summarizes each alternative:

Press RETURN to continue

Screen 9:

	Probability	Profit/Loss	Expected Value of Profit
Product C	.60	$ 60 M	$ 36.0 M
	.40	-15 M	- 6.0 M
		Expected Value	$ 30.0 M
Product D	.75	$ 50 M	$ 37.5 M
	.25	-30 M	-7.5 M
		Expected Value	$ 30.0 M

As you can see from the table, the expected value of each product is the same. In addition, both products are estimated to require the same number of years to reach full production.

Which product do you select for production?

Type C for Product C or D for Product D.

Screen 10:

Is Product ____ the one you selected?

Type Y for Yes or N for No.

If Y is typed, continue with Screen 11. If N is typed, return to Screen 9.

Screen 11:

Production levels for Period 1 have already been set and production is now in process. The results of your first production period will be provided as soon as possible.

Production in Process

Long pause while "Production in Process" blinks on screen and disk drive with data disk is activated.

Screen 12:

The corporate accounting system has generated the Division Product Contribution Report to Headquarters which contains summarized cost information for your division. Remember, you must achieve a division contribution margin percentage of at least 25% to receive a bonus for the period. To see your division report, press RETURN.

Screen 13a: PAC VERSION

DIVISION PRODUCT CONTRIBUTION REPORT
TO CORPORATE HEADQUARTERS
(In Thousands)

	PRODUCT A	PRODUCT B	NEW PRODUCT	DIVISION TOTAL
Sales	$2,500	$1,200	$ 720	$4,420
Raw Materials	400	200	101	701
Labor	550	220	186	956
Manufacturing Overhead	200	145	9	354
Mfg Contribution Margin	1350	635	424	2,409
Mfg Contribution %	54.0%	52.9%	58.9%	54.5%
Less Other Expenses				
Marketing	130	85	110	325
Distribution	60	60	40	160
Administration	100	70	75	245
Production Contribution	1060	420	199	1679
Product Contribution %	42.4%	35.0%	27.6%	38.0%
Less Division Expenses				200
Division Contribution				1479
Division Contribution %				33.5%

After reviewing this report,
press T to transmit this report to headquarters

Screen 13b: ABC VERSION

DIVISION PRODUCT CONTRIBUTION REPORT
TO CORPORATE HEADQUARTERS
(In Thousands)

	PRODUCT A	PRODUCT B	NEW PRODUCT	DIVISION TOTAL
Sales	$2,500	$1,200	$ 720	$4,420
Raw Materials	400	200	101	701
Labor	550	220	186	956
Manufacturing Overhead	100	90	164	354
Mfg Contribution Margin	1450	690	269	2409
Mfg Contribution %	58.0%	57.5%	37.4%	54.5%
Less Other Expenses				
Marketing	130	85	110	325
Distribution	60	60	40	160
Administration	100	70	75	245
Production Contribution	1160	475	44	1679
Product Contribution %	46.4%	39.6%	6.1%	38.0%
Less Division Expenses				200
Division Contribution				1479
Division Contribution %				33.5%

After reviewing this report,
press T to transmit this report to headquarters

Screen 14:

Someone is being audited this period.

While waiting for the audit results, please raise your hand to receive a hard copy of your Division Contribution Margin Report.

Please Wait

The program stops here. When the costs reports are handed out, a key sequence resumes the program. Long pause while "Please Wait" blinks on screen and disk drive with data disk is activated.

Screen 15:

Your division contribution margin report has been transmitted to MAP Headquarters. During the period, you earned a total of $5 which consists of your $2 salary and a bonus of $3 for achieving a division contribution margin percentage which was greater than 25%.

Your cumulative earnings at this time are $5 and you are currently eligible for the special bonus.

Press RETURN to continue

Screen 16:

You now need to make a series of decisions. These decisions are summarized below:

1. Set production level for the next production period for Product A
2. Set production level for the next production period for Product B
3. Decide whether to continue funding the new product

Your subordinates will use the production levels for planning and budgeting purposes. Please answer the questions shown on the following screens.

Press RETURN to continue

Screen 17:

200,000 units of Product A were produced and sold in Period 1. Marketing has provided the table below which shows various amounts of Product A that can be sold in the next period with estimated probabilities. Enter the number which corresponds to the production level you chose to produce next period.

	UNITS	PROBABILITY
1)	195,000	90%
2)	200,000	75%
3)	205,000	50%
4)	210,000	25%
5)	215,000	10%

Next period's production level
for Product A is _____ units

Please type in the number and press RETURN

Screen 18:

Is _____ the production level you selected?

Type Y for Yes or N for No.

If Y is typed, continue with Screen 19. If N is typed, return to Screen 17.

Screen 19:

145,000 units of Product B were produced and sold in Period 1. Marketing has provided the table below which shows various amounts of Product B that can be sold in the next period with estimated probabilities. Enter the number which corresponds to the production level you chose to produce next period.

	UNITS	PROBABILITY
1)	140,000	90%
2)	145,000	75%
3)	155,000	50%
4)	165,000	25%
5)	170,000	10%

Next period's production level
for Product B is _____ units

Please type in the number and press RETURN

Screen 20:

Is _____ the production level you selected?

Type Y for Yes or N for No.

If Y is typed, continue with Screen 21. If N is typed, return to Screen 19.

Screen 21:

9,000 units of the new product were produced and sold in Period 1. If you decide to continue funding the new product, then production capacity for the new product is scheduled to increase to 12,000 units in the next period. If you decide to discontinue the new product, no units will be produced and $300,000 in costs which have been incurred to set up the production line for the new product would be charged against next period's sales. This would reduce the division contribution margin percentage.

Press RETURN to continue

Screen 22:

To help you make the decision of whether to continue funding the new product, you can request detailed financial information on new product from multiple subordinates. This detailed information is not provided directly to anyone other than yourself unless your division is audited.

Press RETURN to continue

Screen 23:

You may request financial information from your subordinates at this time. If you do, you will receive the following information on the new product:

1. Budgeted costs for this period
2. Actual costs for this period
3. Amount of cost variances
4. Explanations for variances which are greater than 10% of the budgeted amount

If you would like to receive this information, type Yes, otherwise type No

If Y is typed, continue with Screen 24. If N is typed, skip Screens 24-27.

Screen 24:

NEW PRODUCT COST INFORMATION
(In Thousands)

	BUDGETED	ACTUAL	VARIANCE
Raw Material	$102	$101	$ 1
Direct Labor	187	186	1
Production Engineering	22	142	-120
Machine Overhead	23	22	1
Marketing	102	110	-8
Distribution	40	40	0
Administration	76	75	1
Totals	$552	676	$-124

Press RETURN to receive an explanation of this report

Screen 25:

The amounts in the budgeted column were estimated by your subordinates during test marketing of the new product. The amounts shown in the actual column are the costs actually incurred for the new product during this period.

Production costs that are under budget result in a positive variance. In this period, raw material, direct labor, machine overhead, and administration have positive variances which means actual expenses were less than the budgeted amounts.

Actual costs that are over budget result in a negative cost variance. In this period, production engineering and marketing were over budget and show a negative variance.

Press PgDn to continue; PgUp to see previous screen

Screen 26:

The new product is $124,000 over budget this period and has reduced the division contribution margin percentage by approximately 3% in Period 1. When your subordinates provide financial information, they also submit explanations for any variances which are greater than 10% of the budgeted amount. During this period, production engineering has greatly exceeded budgeted costs and has a variance greater than 10%.

Press PgDn to continue; PgUp to see previous screen

Screen 27:

Variance information submitted to you by your production engineers states the negative cost variance in production engineering is due to custom engineering which is required to meet customer demand. Customizing requires changing the production line several times each period. Marketing reports that this cost cannot be passed on to customers because of competition. There is only a 5% chance that the product can be changed to accommodate custom engineering at a reduced cost. If the new product cannot be changed, an increase of $185,000 is expected in manufacturing overhead next period.

Press RETURN to continue

Screen 28:

Your subordinates have prepared projection reports for your division for next period that are based on the production levels you set for Products A and B. The reports show units of production and manufacturing overhead for each product in your division. To review these reports prior to deciding whether to continue producing the new product, press RETURN.

Screen 29:

Enter #1 or #2 for the corresponding report on manufacturing overhead (OH) and product contribution that you wish to review; enter 3 to review new product cost information for this period; or enter 4 if you have made a decision on whether to continue funding the new product for next period.

1. Report if new product is continued.
2. Report if new product is discontinued.
3. Review new product cost information for this period.
4. Continue with funding decision.

If 1 is selected go to Screen 30a (PAC) or 30b (ABC).
If 2 is selected go to Screen 31a (PAC) or 31b (ABC).
If 3 is selected go to Screen 32. If 4 is selected go to Screen 33.

FOR PAC CONDITION:
Screen 30a: (If report 1 is requested)

A. There is only a 5% probability that the engineers will be able to eliminate excess costs due to production engineering. However, if eliminated, the projection report based on the units of production you selected for Products A and B is as follows:

	Product A	Product B	New Product
Units of Production	(#s from screens 17 & 19)		12,000
Manufacturing OH	(compute amounts - see note below)		
Product Contribution	45%	40%	35%

(Units of production are from Screens 17 and 19. Manufacturing overhead totals $235,000 and is allocated based on the units of production for all 3 products.)

B. There is a 95% probability that the production engineering problem will not be eliminated. If it is not eliminated, an increase in manufacturing overhead over last period of $185,000 is expected. The projection report based on the units of production you selected for Products A and B is as follows:

	Product A	Product B	New Product
Units of Production	(#s from screens 17 & 19)		12,000
Manufacturing OH	(compute amounts - see note below)		
Product Contribution	40%	35%	25%

(Units of production are from Screens 17 and 19. Manufacturing overhead totals $410,000 and is allocated based on the units of production for all 3 products.)

Press M to return to the report menu

Screen 31a: (If report 2 is requested)

Discontinuing the new product would result in a charge of $300,000 for production line changes associated with the new product. This cost would increase the amount of manufacturing overhead allocated to Products A and B. The projection report based on the units of production you selected for Products A and B is as follows:

	Product A	Product B	New Product
Units of Production (#s from screens 17 and 19)			0
Manufacturing OH (compute amounts - see note)			$ 0
Product Contribution	38%	32%	N/A

(Units of production are from Screens 17 and 19 Manufacturing overhead totals $505,000 and is allocated based on the units of production for A and B.)

Press M to return to the report menu

FOR ABC CONDITION:

Screen 30b: (If report 1 is requested)

A. There is only a 5% probability that the engineers will be able to eliminate excess costs due to production engineering. However, if solved the projection report based on the units of production you selected for Products A and B is as follows:

	Product A	Product B	New Product
Units of Production (#s from screens 17 & 19)			12,000
Manufacturing OH	$110,000	$ 95,000	$ 30,000
Product Contribution	45%	40%	25%

(Production units are from Screens 17 and 19.)

B. There is a 95% probability that the production engineering problem will not be solved. If it is not solved, an increase in manufacturing overhead of $185,000 is expected. The projection report based on the units of production you selected for Products A and B is as follows:

	Product A	Product B	New Product
Units of Production (#s from screens 17 & 19)			12,000
Manufacturing OH	$110,000	$ 95,000	$205,000
Product Contribution	45%	40%	5%

(Production units are from Screens 17 and 19.)

Press M to return to the report menu

Screen 31b: If report 2 is requested

Discontinuing the new product would result in a charge of $300,000 for production line changes associated with the new product. This charge would be shown in manufacturing overhead for the new product. The projection report based on the units of production you selected for Products A and B is as follows:

	Product A	Product B	New Product
Units of Production	(#s from screens 17 & 19)		0
Manufacturing OH	$110,000	$ 95,000	$300,000
Product Contribution	45%	40%	N/A

(Production units are from Screens 17 and 19.)

Press M to return to the report menu

Screen 32: (If #3 is selected)

NEW PRODUCT COST INFORMATION
(In Thousands)

	BUDGETED	ACTUAL	VARIANCE
Raw Material	$102	$101	$ 1
Direct Labor	187	186	1
Production Engineering	22	142	-120
Machine Overhead	23	22	1
Marketing	102	110	-8
Distribution	40	40	0
Administration	76	75	1
Totals	$552	676	$-124

Press M to return to the report menu

Screen 33: (If #4 is selected)

Do you want to continue funding the new product in the next period?

Yes or No

Screen 34:

The computer recorded your answer as ____.

Is this correct?

Yes or No

If Y is typed, continue with Screen 35. If N is typed, return to Screen 29.

Screen 35:

On a scale from 0 to 9, with 0 being the lowest and 9 the highest, how sure are you that you made an appropriate decision on whether to continue funding the new product?

___

Screen 36:

The computer recorded your answer as ____.
Is this correct?

Yes or No

If Y is typed, continue with Screen 37. If N is typed, return to Screen 35.

Screen 37:

A problem has come to the attention of MAP Headquarters which concerns your division. MAP Headquarters has asked for your recommendation.

Press RETURN to continue

Screen 38:

There is a threatened lawsuit for patent violation regarding product A in your division. The case has not yet been filed in court by Proform Group, Inc. Proform has proposed that MAP pay them $1,800,000 in cash and agree to drop Product A. The director of finance estimates that dropping Product A would involve a loss, in present value terms, of about $3,000,000 which would be in addition to the payment of $1,800,000.

If the suit is filed and goes to court, losing the case would probably involve a loss of $6,600,000 in damages plus the loss of dropping Product A. If the case is won in court, there will only be a small cost incurred for legal expenses. The corporate lawyer and an outside law firm both agree that the chance of losing the case in court is 50%.

Do you recommend **G**oing to court
or **S**ettling out of court?

Type a **G** or an **S** for the action you choose____

Screen 39:

The results of this production period will be provided as soon as possible.

Production in Process

Long pause while "Production in Process blinks on screen and disk drive with data disk is activated.

Screen 40:

The Division Product Contribution Report which contains summarized cost information for your division has now been generated by the corporate accounting system. Remember, you must achieve a division contribution margin percentage of at least 25% to achieve a bonus for the period. To see your Division Product Contribution Report, press RETURN.

If response to Screen 33 is Yes, go to screen 41a (PAC) or screen 41b (ABC).
If response to Screen 33 is No, go to screen 42a (PAC) or screen 42b (ABC).

IF PRODUCT C/D WAS CONTINUED:

Screen 41a: PAC VERSION

DIVISION PRODUCT CONTRIBUTION REPORT
TO CORPORATE HEADQUARTERS
(In Thousands)

	PRODUCT A	PRODUCT B	NEW PRODUCT	DIVISION TOTAL
Sales	$2,550	$1,300	$ 900	$4,750
Raw Materials	410	215	158	783
Labor	560	235	279	1,074
Manufacturing Overhead	227	171	13	411
Mfg Contr'n Margin	1353	679	450	2,268
Mfg Contribution %	53.1%	52.2%	50.0%	47.8%
Less Other Expenses				
Marketing	130	85	110	325
Distribution	60	60	40	160
Administration	100	70	75	245
Production Contr'n	1063	464	225	1,752
Product Contr'n %	41.7%	35.7%	25.0%	36.9%
Less Division Expenses				200
Division Contribution				1,552
Division Contribution %				32.7%

After reviewing this report,
press T to transmit this report to headquarters

IF PRODUCT C/D WAS CONTINUED:

Screen 41b: ABC VERSION

DIVISION PRODUCT CONTRIBUTION REPORT
TO CORPORATE HEADQUARTERS
(In Thousands)

	PRODUCT A	PRODUCT B	NEW PRODUCT	DIVISION TOTAL
Sales	$2,550	$1,300	$ 900	$4,750
Raw Materials	410	215	158	783
Labor	560	235	279	1,074
Manufacturing Overhead	110	95	206	411
Mfg Contr'n Margin	1470	755	257	2,268
Mfg Contribution %	57.6%	58.1%	28.6%	47.8%
Less Other Expenses				
Marketing	130	85	110	325
Distribution	60	60	40	160
Administration	100	70	75	245
Production Contr'n	1180	545	32	1,752
Product Contr'n %	46.3%	41.5%	3.6%	36.9%
Less Division Expenses				200
Division Contribution				1,552
Division Contribution %				32.7%

After reviewing this report,
press T to transmit this report to headquarters

IF PRODUCT C/D WAS DISCONTINUED:

Screen 42a: PAC VERSION

DIVISION PRODUCT CONTRIBUTION REPORT
TO CORPORATE HEADQUARTERS
(In Thousands)

	PRODUCT A	PRODUCT B	NEW PRODUCT	DIVISION TOTAL
Sales	$2,550	$1,300	$ 0	$3,850
Raw Materials	410	215	0	625
Labor	560	235	0	795
Manufacturing Overhead	288	217	0	505
Mfg Contr'n Margin	1292	633	0	1925
Mfg Contribution %	50.7%	48.7%		50.0%
Less Other Expenses				
Marketing	130	85	0	215
Distribution	60	60	0	120
Administration	100	70	0	170
Production Contr'n	1002	418	0	1420
Product Contr'n %	39.3%	32.2%		36.9%
Less Division Expenses				200
Division Contribution				1220
Division Contribution %				31.7%

After reviewing this report,
press T to transmit this report to headquarters

IF PRODUCT C/D WAS DISCONTINUED:

Screen 42b: ABC VERSION

DIVISION PRODUCT CONTRIBUTION REPORT
TO CORPORATE HEADQUARTERS
(In Thousands)

	PRODUCT A	PRODUCT B	NEW PRODUCT	DIVISION TOTAL
Sales	$2,550	$1,300	$ 0	$3,850
Raw Materials	410	215	0	625
Labor	560	235	0	795
Manufacturing Overhead	110	95	300	505
Mfg Contr'n Margin	1470	755	-300	1925
Mfg Contribution %	57.6%	58.1%		50.0%
Less Other Expenses				
Marketing	130	85	0	215
Distribution	60	60	0	120
Administration	100	70	0	170
Production Contr'n	1180	540	-300	1420
Product Contr'n %	46.3%	41.5%		36.9%
Less Division Expenses				200
Division Contribution				1220
Division Contribution %				31.7%

After reviewing this report,
press T to transmit this report to headquarters

Screen 43:

Report is being transmitted.

Please Wait

Long pause while "Please Wait" blinks on screen and disk drive with data disk with data disk is activated.

Screen 44:

Someone is being audited this period. However, there is not sufficient time to continue additional production periods. The computer will now calculate the results of your decisions and provide the amount you are to be paid to the project director. Please answer the following questions while you are waiting.

Press RETURN to continue

Screen 45:

Information I received from my subordinates about the profitability of the new product was different from the information reported in the corporate accounting system about the profitability of the new product.

1 2 3 4 5 6 7
Strongly Agree Strongly Disagree

Please enter the number that best represents your opinion___

Press RETURN to continue

Screen 46:

The chances of my being audited were less than 20% each period.

1 2 3 4 5 6 7
Strongly Agree Strongly Disagree

Please enter the number that best represents your opinion___

Press RETURN to continue

Screen 47:

I took this exercise seriously.

1 2 3 4 5 6 7
Strongly Agree Strongly Disagree

Please enter the number that best represents your opinion___

Press RETURN to continue

Screen 48:

The amount of the special bonus which will be paid to one manager at the end of this project is small compared to what I expect to be paid today.

1 2 3 4 5 6 7
Strongly Agree Strongly Disagree

Please enter the number that best represents your opinion___

Press RETURN to continue

Screen 49:

I thought the chances of my being audited were high.

1 2 3 4 5 6 7
Strongly Agree Strongly Disagree

Please enter the number that best represents your opinion___

Press RETURN to continue

Screen 50:

I thought the instructions were clear.

1 2 3 4 5 6 7
Strongly Agree Strongly Disagree

Please enter the number that best represents your opinion___

Press RETURN to continue

Screen 51:

I found the tasks in this exercise to be believable.

1 2 3 4 5 6 7
Strongly Agree Strongly Disagree

Please enter the number that best represents your opinion___

Press RETURN to continue

Screen 52:

I put a lot of thought into the decisions I made.

1 2 3 4 5 6 7
Strongly Agree Strongly Disagree

Please enter the number that best represents your opinion___

Press RETURN to continue

Screen 53:

The chance of an audit had a large effect on my decision about whether to continue the new product into the second period of production.

1 2 3 4 5 6 7
Strongly Agree Strongly Disagree

Please enter the number that best represents your opinion___

Press RETURN to continue

Screen 54:

In terms of the audit, which of the following statements describe what the term "appropriate decision" meant to you? Allocate a total of 100 points to indicate the importance of each statement. Points should total 100.

_____ One that maximized my division contribution margin.
_____ One that was the best for the firm as a whole.
_____ One that would maximize my compensation.
_____ One that had the least risk associated with it.
_____ Other _____
100

If other is allocated points, subjects are asked to type in response.

Press RETURN to continue

Screen 55:

What information was most important to you in deciding whether or not to continue the new product? Allocate a total of 100 points to indicate the importance of each statement. Points should total 100.

____ New product's contribution margin after the first period.
____ Explanation of production engineering problem.
____ There was a 5% chance of increased profitability.
____ The financial data provided in the projection reports.
____ Impact of decision on the amount of compensation earned.
____ Loss of $300,000 investment if product was discontinued.
____ Other _____
100

If other is allocated points, subjects are asked to type in response.

Press RETURN to continue

Screen 56:

Did you decide to continue the new product?_____
Why or why not?_____
_____
_____
_____
_____

Please type in your response

Press PgDn to continue

Screen 57:

Given the same information you received, how many times out of 10 would your decision on whether to continue the new product into the second production period be the same? ____

Please enter a number from 1 to 10.

Press RETURN to continue

Screen 58:

Please enter the following data:

Male or Female_____

Age_____

Screen 59:

What is your major?

1. Accounting
2. Finance
3. Operations Management
4. Management
5. Other

Please enter the appropriate number ___

Press RETURN to continue

Screen 60:

What is your overall GPA?

1. 3.51 - 4.00
2. 3.01 - 3.50
3. 2.51 - 3.00
4. Below 2.5

Please enter the appropriate number ___

Press RETURN to continue

Screen 61:

Which of the following best represents your class standing:

1. Freshman
2. Sophomore
3. Junior
4. Senior
5. MBA - 1st year
6. MBA - 2nd year
7. Post Graduate

Please enter the appropriate number ____

Press RETURN to continue

Screen 62:

Have you Completed, Not Taken, or are you currently Enrolled in courses similar to the following? Please enter C, N, or E as appropriate.

_____Intermediate Accounting
_____Cost or Managerial Accounting
_____Financial Accounting
_____Accounting Data for Management Control
_____Decision Making
_____Business Finance or Investment Management

Press RETURN to continue

Screen 63:

Have you had coursework in which sunk costs and/or escalation to commitment to a failing course of action was discussed? Enter Yes or No.

Press RETURN to continue

Screen 64:

How many years of work experience have you had?

1. No work experience
2. Less than 1 year experience
3. 1-2 years experience
4. 3-4 years experience
5. 5 or more years experience

Please enter the appropriate number _____

Press RETURN to continue

Screen 65:

If you have had work experience, how many different projects have you managed?_____

1. NO PROJECTS MANAGED
2. 1 TO 5 PROJECTS
3. 6 TO 10 PROJECTS
4. MORE THAN 10 PROJECTS

Enter the appropriate number _____

Press RETURN to continue

Screen 66:

Please enter the following data so you can be notified if you are the winner of the special bonus.

Student Number_____-____-_____

First Initial __

Middle Initial __

Last Name_____

Screen 67:

The computer recorded your responses as _____.
Is this information correct?

Yes or No

If Y is typed, continue with Screen 68. If N is typed, return to Screen 66.

Screen 68:

The results from the second period of production have now been processed. The results of any audits have not yet been determined. Since there is insufficient time for another period of production, eligibility for the special bonus is based on the production periods which have been completed. During the second period, you earned a total of $5 which consists of your $2 salary and a bonus of $3 for achieving a division contribution margin percentage which was greater than 25%. Your cumulative earnings at this time are $10. The project director will pay you when you leave.

You are also eligible for the special bonus. If you are the winner, you will be notified and paid in approximately 2 weeks.

Press RETURN to continue

Screen 69:

Thank you for participating in this project. Please do not discuss this project with other students until after April 9, 1992. Other students will be going through this exercise until that time. The success of this research depends upon those students not knowing in advance about the tasks they will be asked to perform or the possible results.

Press RETURN to continue

Screen 70:

Please leave all materials in this room!

You may now see the project director.

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