THE EFFECTS OF EVALUATIVE ACCOUNTING INFORMATION ON PERFORMANCE: AN INVESTIGATION

DISSERTATION

Presented in Partial Fulfillment of the Requirements for the Degree Doctor of Philosophy in the Graduate School of The Ohio State University

By
Marleen M. Izumi

* * * * *

The Ohio State University

1977

Reading Committee:
Professor Thomas J. Burns  
Professor John V. Baumler  
Professor James C. Kinard  
Professor Michael A. Fligner

Approved By

___Thomas J. Burns___  
Adviser  
Department of Accounting
ACKNOWLEDGMENTS

I am indebted to the members of my Reading Committee for their assistance in the formulation and conduct of this study. Professor Thomas Burns provided much technical assistance and personal interest from the earliest stages through the final completion of the dissertation.

Professor Michael Fligner provided invaluable aid in the analysis of the experimental data. Professor James Kinard contributed valuable criticisms and ideas in his careful reading of the earlier manuscripts. Finally, Professor John Baumler provided unstinting assistance, encouragement and advice throughout the conduct of this inquiry - without his assistance, this study would never have reached completion.
VITA

1970 . . . . . . B. Comm., University of British Columbia, Vancouver, B.C., Canada

1970-1975 . . . . Ohio State Graduate Fellowship, Department of Accounting, The Ohio State University, Columbus, Ohio

1971-1976 . . . . Teaching Associate, Department of Accounting, The Ohio State University, Columbus, Ohio

1974 . . . . . . M.A., The Ohio State University, Columbus, Ohio

FIELDS OF STUDY

Major Field: Accounting

Minor Fields: Organization Behavior
             Industrial Psychology
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACKNOWLEDGMENTS</td>
<td>11</td>
</tr>
<tr>
<td>VITA</td>
<td>iii</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td>vi</td>
</tr>
<tr>
<td>LIST OF FIGURES</td>
<td>viii</td>
</tr>
<tr>
<td>Chapter</td>
<td></td>
</tr>
<tr>
<td>I. THE ACCOUNTING PROCESS AND INTERNAL CONTROL</td>
<td>1</td>
</tr>
<tr>
<td>Introduction</td>
<td>1</td>
</tr>
<tr>
<td>Accounting Control Systems</td>
<td>3</td>
</tr>
<tr>
<td>A Model of the Accounting Process</td>
<td>18</td>
</tr>
<tr>
<td>in Economic Systems</td>
<td></td>
</tr>
<tr>
<td>II. REVIEW OF PERTINENT LITERATURE</td>
<td>32</td>
</tr>
<tr>
<td>The Accounting Approach to Performance</td>
<td></td>
</tr>
<tr>
<td>Reporting</td>
<td>32</td>
</tr>
<tr>
<td>The Behavioral Effects of Feedback</td>
<td>45</td>
</tr>
<tr>
<td>The Behavioral Effects of Task Goals</td>
<td>57</td>
</tr>
<tr>
<td>Concluding Remarks</td>
<td>67</td>
</tr>
<tr>
<td>III. THE EXPERIMENTAL STUDY</td>
<td>69</td>
</tr>
<tr>
<td>Theoretical Implications of Prior Research</td>
<td>69</td>
</tr>
<tr>
<td>Scope of the Experimental Study</td>
<td>75</td>
</tr>
<tr>
<td>Description of the Basic Research</td>
<td>79</td>
</tr>
<tr>
<td>Methodology</td>
<td>93</td>
</tr>
<tr>
<td>The Research Hypotheses</td>
<td></td>
</tr>
<tr>
<td>IV. ANALYSIS OF RESULTS</td>
<td>96</td>
</tr>
</tbody>
</table>

iv
V. SUMMARY AND CONCLUSIONS

Summary of the Research
Conclusions
Limitations of the Research
Extensions of the Research

APPENDIX

A: Experimental Materials
B: Normality Tests
C: Analysis of Variance in Periods 7, 8 and 9
D: Other Experimental Results
E: Profitability and Compliance Scores

BIBLIOGRAPHY
LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Behavioral Assumptions of the Traditional Management Accounting Model of the Firm.</td>
<td>36</td>
</tr>
<tr>
<td>2</td>
<td>Behavioral Assumptions from Modern Organization Theory.</td>
<td>37</td>
</tr>
<tr>
<td>3</td>
<td>Analysis of Variance - Profitability (Periods 7-9).</td>
<td>106</td>
</tr>
<tr>
<td>4</td>
<td>Analysis of Variance - Arcsine Transformed Profitability (Periods 7-9).</td>
<td>107</td>
</tr>
<tr>
<td>5</td>
<td>Analysis of Variance - Compliance (Periods 7-9).</td>
<td>108</td>
</tr>
<tr>
<td>6</td>
<td>Table of Simple Main Effects - Profitability and Compliance (Periods 7-9).</td>
<td>111</td>
</tr>
<tr>
<td>7</td>
<td>Tukey's Multiple Comparison Test.</td>
<td>114</td>
</tr>
<tr>
<td>8</td>
<td>Scheffé's Multiple Comparison Test.</td>
<td>116</td>
</tr>
<tr>
<td>9</td>
<td>Tests for Normality - Profitability Scores.</td>
<td>170</td>
</tr>
<tr>
<td>10</td>
<td>Tests for Normality - Compliance Scores</td>
<td>171</td>
</tr>
<tr>
<td>11</td>
<td>$F_{max}$ Statistics for Subjects' Scores.</td>
<td>172</td>
</tr>
<tr>
<td>12</td>
<td>Analysis of Variance - Profitability (Period 7).</td>
<td>174</td>
</tr>
<tr>
<td>13</td>
<td>Analysis of Variance - Profitability (Period 8).</td>
<td>175</td>
</tr>
<tr>
<td>14</td>
<td>Analysis of Variance - Profitability (Period 9).</td>
<td>176</td>
</tr>
<tr>
<td>15</td>
<td>Analysis of Variance - Arcsine Transformed Profitability (Period 7).</td>
<td>177</td>
</tr>
<tr>
<td>Table</td>
<td>Title</td>
<td>Page</td>
</tr>
<tr>
<td>-------</td>
<td>----------------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>16</td>
<td>Analysis of Variance - Arcsine Transformed Profitability (Period 8)</td>
<td>177</td>
</tr>
<tr>
<td>17</td>
<td>Analysis of Variance - Arcsine Transformed Profitability (Period 9)</td>
<td>178</td>
</tr>
<tr>
<td>18</td>
<td>Analysis of Variance - Compliance (Period 7)</td>
<td>179</td>
</tr>
<tr>
<td>19</td>
<td>Analysis of Variance - Compliance (Period 8)</td>
<td>180</td>
</tr>
<tr>
<td>20</td>
<td>Analysis of Variance - Compliance (Period 9)</td>
<td>181</td>
</tr>
<tr>
<td>21</td>
<td>Kendall Tau Coefficient for Profitability and Achievement Motivation</td>
<td>184</td>
</tr>
<tr>
<td>22</td>
<td>Kendall Tau Coefficient for Compliance and Need for Self-Esteem</td>
<td>185</td>
</tr>
<tr>
<td>23</td>
<td>Subjects' Perceptions of Budgets Assigned to Them</td>
<td>188</td>
</tr>
<tr>
<td>24</td>
<td>Subjects' Opinions on the Usefulness of the Experimental Reports</td>
<td>189</td>
</tr>
<tr>
<td>25</td>
<td>Subjects' Evaluations of Own Performance</td>
<td>190</td>
</tr>
<tr>
<td>26</td>
<td>Profitability Scores</td>
<td>192</td>
</tr>
<tr>
<td>27</td>
<td>Compliance Scores</td>
<td>194</td>
</tr>
</tbody>
</table>
# LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The Internal Accounting Process in an Ideal Planning and Control System.</td>
<td>25</td>
</tr>
<tr>
<td>2</td>
<td>The Internal Accounting Process in an Imperfect Planning and Control System.</td>
<td>28</td>
</tr>
<tr>
<td>3</td>
<td>Goal Difficulty Relationships</td>
<td>59</td>
</tr>
<tr>
<td>4</td>
<td>General Relationship between Environmental and Behavioral Complexity.</td>
<td>68</td>
</tr>
<tr>
<td>5</td>
<td>Variables Investigated in the Experimental Study.</td>
<td>76</td>
</tr>
<tr>
<td>6</td>
<td>The Experimental Groups of the Study.</td>
<td>79</td>
</tr>
<tr>
<td>7</td>
<td>Observed Relationship between Profitability and Type of Feedback at the Two Experimental Budget Levels</td>
<td>100</td>
</tr>
<tr>
<td>8</td>
<td>Observed Relationship between Compliance and Type of Feedback at the Two Experimental Budget Levels</td>
<td>102</td>
</tr>
</tbody>
</table>
CHAPTER ONE

THE ACCOUNTING PROCESS AND INTERNAL CONTROL

I. Introduction

This study involves an investigation of the effects that evaluative accounting reports have upon organizational performance. Specifically, it involves an examination of the behavioral implications of evaluative reports in the planning and control systems of organizations. The major focus of the research is on the roles that accounting outputs and procedures occupy in the organizational schema of planning and control. A secondary concern is the consideration of some performance measures which are not currently included in accounting reports, but which may include relevant information regarding performance. Such measures have been designated as intermediate or intervening performance variables in the current study. In order to examine the implications of evaluative accounting reports on organizational performance and the relevance of intermediate performance variables in performance reporting, the research includes an experimental laboratory study to investigate some of these variables.

In the remainder of this chapter, the conceptual foundation for the research is discussed and models relating accounting processes to the organizational system of planning and control are
presented. Chapter Two reviews the literature in the behavioral sciences which are relevant to the research. In Chapter Three, the research methodology is described. The dependent and independent variables under experimental investigation are identified, the experimental procedures are described, and the hypotheses underlying the experimental study are stated. Chapter Four involves the analysis of experimental results. Finally, Chapter Five is comprised of a summary of the research and a discussion of the conclusions, limitations and implications of the research.
II. Accounting Control Systems

The word "system" is defined in the current study as a "complex unit formed of many, often diverse parts subject to a common plan or serving a common purpose."\(^1\) Planning and control involves the overall process of assuring that organizational resources are obtained and used effectively and efficiently in the accomplishment of the organization's objectives. In the current study, planning and control are not considered to be two separate activities. As Anthony explains, "although planning and control are definable abstractions and are easily understood as calling for different types of mental activity, they do not relate to separable major categories of activities actually carried on in an organization, either at different times, or by different people, or for different situations."\(^2\) Planning and control activities determine what the organization is to do, decide how to do it and assure that desired results are obtained.

Planning and control systems, then, can be defined as the diverse elements of an organization - its participants and their activities - which are involved in the process of assuring that organizational resources are obtained and used effectively and efficiently in the accomplishment of the organization's objectives.\(^3\)

---

1 From Webster's Unabridged Dictionary.


3 This definition corresponds to Anthony's definition of management control in Anthony, Planning and Control Systems: A
Throughout this study, all the activities and processes encompassed by organizational planning and control will be referred to simply as organizational control for easy reference. Similarly, all the diverse elements of organizational planning and control systems will be referred to as control systems.

Internal accounting systems are subsystems within the larger organizational control system. They provide information regarding various input and output data such as costs, profits and transfer prices. They also supply information regarding capital decision-making, such as capital costs and projected returns on investment. They further furnish performance-related reports such as budgets and income statements. The information provided by accounting systems can be used to ensure that desired results are obtained. Thus, accounting systems comprise a part of the information-handling subsystem of the organizational control system.

Information handling is the process of collecting, manipulating and transmitting information whatever its use is to be. 4 For internal accounting systems, information handling includes operationally important score-keeping activities such as payroll and processing activities such as order-processing or sales-accounts receivable cycles and procurement or purchases-accounts payable cycles. It also includes activities involved in measuring,

\[\text{Framework for Analysis, p. 17.}\]

\[4 \text{ Ibid., p. 94.}\]
appraising and improving management performance and worker efficiency which are directly relevant to organizational systems directed toward controlling the behaviors of organizational participants.

The purpose of accounting systems is to provide economic information to various interested parties. The availability of information, however, does not necessarily ensure either its acceptance or its appropriate use. If all the implications regarding both the meaning and impact on behavior of the information available are not known, information cannot be optimally utilized. Thus in considering the problems of accounting for economic systems, there is a need to go beyond the questions regarding economics and measurement and gain a systematic understanding of the wider human and social factors that influence the role of accounting systems. The analysis of the nature of accounting information and the investigation of the effects of this information should contribute to an increased understanding of the ramifications of information content and application and should lead to a more effective utilization of the accounting system.

The major concern of the current study involves the effects of the evaluative propensities of accounting reports which have behavioral implications. The study involves an investigation of the effects of evaluative accounting reports upon the behaviors manifested by those organizational participants who either receive the reports directly or are affected by them in the process of performance evaluation and/or in the presentation of organizational
rewards. Accounting reports provide feedback information regarding the performance of organizational participants and the outcomes or consequences of their performance to the organization. For example, production reports indicate the outputs achieved by a specific organizational participant or a group of participants during a specified period of time; cost and performance reports indicate the monetary outcomes of various divisional or organizational activities.

The objective of many feedback systems, including accounting control systems, is to affect human behavior. Budgets and performance reports are designed to direct organizations towards greater efficiency by guiding the human participants of these organizations towards increased outputs or performance. Since performance is known to be related to the level of aspiration, organizational outputs may be increased by inducing organizational participants towards increased aspiration levels. Various studies have indicated that the level of aspiration is a variable which management has the ability to alter.

---

5 Feedback communications can be divided into two categories: cognitive or directive and motivational or incentive. Cognitive types of feedback communications provide information involving current facts, status and progress toward goals. Motivational types of feedback communications (the focus of the current study) involve such factors as emotional climate or atmosphere, loyalties, hostilities, attitudes, individual work motivations and feelings of support, appreciation or rejection. Further discussion of these two types of feedback can be found in Chapter Two.

6 See studies by Locke et al in the bibliography.

7 For a summary of some of these findings, see Selwyn W. Becker and David Green, Jr., "Budgeting and Employee Behavior," Journal of Business (October 1962, 35, pp. 392-402) and Andrew C.
Such links between performance and behavioral variables and the relevance of these relationships to accounting control systems merits a thorough investigation of the concepts of the behavioral sciences as they relate to accounting practice.

Accounting control systems have often failed to consider the significance of behavioral factors. Rosen and Schneck summarize empirical evidence to "validate the hypothesis that many behavioral dysfunctions result from both accounting systems per se and from their application by management." They discuss various behavioral dysfunctions that result from information overload, performance appraisal and the failure of present accounting systems to account for human resources.

Ijiri, Jaedicke and Knight also indicate that accounting has not always considered behavioral effects,

Until recently discussions of alternative accounting methods have been directed primarily toward how outputs from accounting systems differ, depending upon the accounting methods that are used. But a more important question is whether these different profit figures affect managers' decisions and, if so, under what conditions.

---


Likert complains that inadequate measurements provided by accounting systems often lead to erroneous decisions.

Working from seriously inadequate measurements, the different levels of management today are expected to guide and change the causal variables - including their own behavior - so as to maintain the end-result variables at the desired levels. Because they lack adequate measurements, managers and supervisors today unwittingly make mistakes.  

Likert's basic proposition is that present accounting systems do not measure a substantial and important asset of the organization - its human resources. 

Ridgway has cautioned against the indiscriminate use of numerical measurements without full awareness of possible side effects.

Quantitative measures of performance are tools, and are undoubtedly useful. But research indicates that indiscriminate use and undue confidence and reliance in them result from insufficient knowledge of the full effects and consequences. Judicious use of a tool requires awareness of possible side effects and reactions. Otherwise, indiscriminate use may result in side effects and reactions outweighing the benefits.

Schleb suggests that accounting philosophy is not based on sound management insight as to what motivates men to work or create. As a consequence, accounting records may not be viewed as management tools which should aid and abet the creative initiative of the whole

---


management team.

Historically, general theory and practice have dictated that the purpose of [accounting] systems is to simply report deviations. This reporting can be helpful. This approach has disadvantages if, in addition, the records are to be used as management tools for stimulating maximum accomplishment. It tends to point out errors instead of encouraging sound achievement and development. In many cases it may actually retard improvement.

McRae\(^\text{14}\) contends that most business organizations utilize systems of control which were developed in the highly authoritarian culture of the nineteenth century. These control systems treat employees as machines—identical, interchangeable units who can be programmed to meet some preconceived budget. McRae argues that although mechanistic control systems may have been suitable or workable for the pattern of values and attitudes existing when accounting systems were designed, the values and attitudes of the second half of the twentieth century require a recognition of the human nature of employees. Other researchers who have discussed the failure of accounting systems to consider behavioral implications include Churchill and Stedry,\(^\text{15}\) Willingham and Sorenson.\(^\text{16}\)


\(^{16}\) John J. Willingham and James E. Sorenson, "The Behavioral Science Milieu of Accounting," The International Journal of Accounting, Education and Research (Fall 1971), 7, pp. 49-63.
Caplan and Devine. According to McRae, the reason for the failure of accounting systems to recognize the significance of behavioral factors in the past was the authoritarian orientation of traditional accounting control systems which operated as if individuals participate in business organizations for extraneous satisfactions only. Extraneous satisfactions derive from rewards granted to organizational members for participation. They include monetary and monetary based benefits such as pensions and various social benefits such as relationships with fellow workers. Authoritarian-oriented systems do not consider the possibility that organizational participants find the job itself satisfying. The concept that individuals perform their organizational roles for extraneous considerations only has been designated by Katz and Kahn as the "instrumental" cycle. In the instrumental cycle theory, performance occurs in response to rules which must be followed to insure rewards (wages) and to escape penalties.

19 McRae, "The Behavioral Critique of Accounting."
21 An alternative view to the "instrumental" cycle notion is the theory that individuals perform their roles because they find rewards intrinsic in the production activity itself. That is, individuals can enjoy and express themselves through their work. If a task generates motivation in and of itself, the opportunities for both organizational productivity and individual satisfaction should be optimized.
In agreement with McRae, Argyris contends that conventional cost control systems monitor employee behaviors and transmit the information "up the line, across, and down again, lowering morale and creating hostility between various levels of the organization." Argyris believes that employees view the control system as punitive, utilizing "evaluative techniques that are unfair in that they continually accent failures without showing why such failures are necessary." 

Consistent with the traditional authoritarian-oriented system of business organizations, accounting control systems have defined non-human variables as the crucial ones to be measured and reported. Admittedly, the limitations of time and efficiency allow only a small set of the totally available data to be admitted into the information processing system for reporting purposes. However, the selection of what information is to be processed and reported has been influenced by traditional authoritarian-oriented organization theory.

Golembiewski developed the proposition that contemporary accounting is a function of traditional theory of organizations. He believes that the effects of the principles of traditional theories of organization "are clearly reflected in the purposes, procedures and problems of accountancy." The procedures for internal reporting

23 Ibid., p. 241.
were particularly perceived by Golembiewski as dominated by the principles of traditional organization theory. For example, the traditional theory of organization encourages a specialization of the various organizational units while it requires that efforts of each unit be coordinated into a common flow of work. Internal accounting systems traditionally provide reports on unit performance, encouraging sub-optimal decisions by each organizational unit. Caplan also supported the theory that management accounting had used the classical model of organization theory "as the basis for its structure without significant modification or serious question as to the validity of the basic model."

In failing to recognize the significance of behavioral factors, accounting procedures have generally measured "end-result" variables such as production, sales, profits and various earnings ratios. The proliferation of budgets, production reports, performance reports and income statements attest to the end-result measure orientation of accounting procedures. Accounting systems provide a fair amount of information about the market and their organization's share of it. They can also report fairly accurately on levels of inventories, investments in plant and equipment and in liquid holdings. These end-result measures are not meaningless insofar as they represent ultimate outcomes of organizational activities and end-result measures have been of greatest interest to non-managerial owners and shareholders.

25 Ibid., p. 333.
26 Caplan, Management Accounting and Behavioral Science, p. 10.
However, internal reports should provide information upon which plans can be based, by which managers can be effectively evaluated and rewarded, and therefore through which organizational behavior can be affected. End-result measures provide little information about the internal human state of the organization.

The internal state of an organization is reflected by such intermediate variables as worker loyalty, skills and abilities, motivations and capacity for effective interaction, communication and decision-making. Likert has labeled these intermediate factors as intervening variables. Examples of intervening variables offered by Likert involve perceptions, attitudes, expectations and motivations and include such factors as interest and involvement in work, loyalty, feelings of responsibility to see that the work gets done, and attitudes toward superiors and high producers. Brummet, Flamholtz and Pyle identified similar intervening variables that facilitate the management of human resources: attitudes, motivation, decision-making, communication, control and cooperation. Argyris has indicated that a proper management accounting system should measure "goldbricking, rate setting, apathy and non-involvement, lack of openness, conformity, mutual distrust, extreme commitment and interdepartmental rivalries." These intervening variables along with

---

27 Likert, New Patterns of Management, p. 61.


such others as absenteeism, honesty, reliability and compliance, are often found in textbook lists of managerial behaviors considered favorable to the efficient functioning of organizations. 30

Intervening variable measures are significant for a number of reasons. First, they are leading indicators of ultimate outcomes of performance. They can reflect upon managerial performance in a more timely manner than end-result measures by preceding or presaging future divisional outcomes. For example, certain managerial styles may cause deterioration in positive company attitudes and increases in conflict, hostility and management distrust which will eventually result in increased turnover, lower product quality, worker slowdowns, sabotage or strikes. These behaviors will ultimately affect such end-result reports as income statements. However, end-result reports do not provide as early a warning of the dysfunctional consequences of unfavorable managerial styles as would reports that regularly measure intervening variables.

Another example of the time lag between changes in the causal variable and the resultant effects in the end-result variables involve efforts by managers to increase current productivity by either reducing product quality or increasing pressure on their subordinates. Such efforts may result in immediate short-run improvements in end-result variables. However, the resultant effects on dissatisfied

customers or hostile subordinates are likely to lead to decreases in end-result measures in the long-run. Due to the eventual impact of causal variables on end results, the measurement of intervening variables is important for ensuring continued organizational effectiveness. Such measurements provide early warning signals of organizational problems and, for most purposes, early detection of adverse changes is important as it enables prompt corrective actions that can prevent serious problems from developing.

Another advantage in obtaining periodic measurements of intervening variables lies in insights gained regarding the causes of adverse trends. The unearthing of sources of difficulties would facilitate the determination of those corrective actions most likely to bring about the desired improvements.

Intervening variables are also significant in that over-reliance on end-result measurements involves many negative behavioral consequences for the organization. Since intervening indicators of managerial performance have received relatively little attention in accounting systems due to measurement difficulties and to early failure to recognize the significance of behavioral factors, an imbalance has resulted between end-result and intervening variable measurement. Likert\textsuperscript{31} believes that the serious imbalance of measurements has many negative consequences for the organization. For example, management might use accounting data as tools of punitive control for short-run gains causing negative motivational effects

\textsuperscript{31} Likert, \textit{The Human Organization}. 
which will adversely affect organizational outcomes in the long-run. Another negative consequence of the emphasis on end-result measures is that employees may develop ingenious ways of circumventing and distorting performance measurements. For example, workers can stockpile as was reported in the Hawthorne study\textsuperscript{32} where workers set aside supplies of finished parts as insurance against a bad day. Performance measures can be distorted through direct falsification of reports or through emphasis on favorable evidence and concealment of damaging evidence. Thompson reports that distortion of organizational records is a widespread phenomenon.\textsuperscript{33}

Ridgway also states quantitative performance measurements can have undesirable consequences.\textsuperscript{34} Emphasis on single measures of performance can lead to employee emphasis on this single factor and neglect of other factors important to overall organizational outcomes. Support for this argument was provided by Blau who investigated interviewers in a public employment agency who were appraised by the number of interviews they conducted. These interviewers were found to give primary consideration to the completion of as many interviews as possible instead of to job location for their clients, the primary goal of the agency.\textsuperscript{35}

\textsuperscript{32} Fritz J. Roethlisberger and W. J. Dickson, Management and the Worker (Cambridge, Mass.: Harvard University Press, 1939).


\textsuperscript{34} Ridgway, "Dysfunctional Consequences of Performance Measurement."

\textsuperscript{35} Peter M. Blau, The Dynamics of Bureaucracy (Chicago:
The studies reviewed in this chapter indicate that intervening variables are significant in performance measurement because: (1) they provide early warning signals of organizational difficulties, (2) they provide insight into the cause of adverse trends, and (3) they can reduce the dysfunctional effects that arise from the overemphasis of end-result criteria. These arguments suggest that intervening or intermediate variables merit closer investigation to improve our understanding of their behavioral implications for organizations.

In summary, the preceding discussion has reviewed the argument that accounting systems have not fully considered the behavioral implications of their procedures and outputs. Among these unattended considerations are the effects of the evaluative nature of accounting performance reports in the organizational system of planning and control. These effects are of major interest in the current investigation. A second relatively uninvestigated behavioral element of interest in the study is the measurement of intervening variables whose significance to organizational control is supported by a number of persuasive arguments. The following section will suggest a model that identifies the role of accounting performance reports in the organizational system of planning and control.

III. A Model of the Accounting Process in Control Systems

Organizational control systems are necessary in that organizations require a certain amount of conformity to keep the behaviors of their participants in accordance with organizational objectives and plans. Control is required for the integration of diverse activities in which any organization is engaged. The function of control is to create order and coordination out of diverse interests and potentially diffuse behaviors of organizational members.

Tannenbaum has suggested that control is necessary due to an universal law of nature: organizations tend toward disorder or entropy. Individuals who behave on the basis of their own inclinations tend to demonstrate a high degree of randomness in their behavior. When the diverse numbers of organizational participants are considered together, random individual behaviors become a display of a high degree of organizational entropy. Control is the means by which entropic tendencies are negated and organizational control is necessary to reduce the randomness of collective behavior.

Organizational control systems provide the means by which organizations can assure that resources are obtained and used effectively and efficiently in the accomplishment of organizational objectives. Organizational control systems typically include organizational objectives, behavioral directives to participants, performance evaluation and organizational rewards. The control system

---

specifies the behavior that participants must perform and the reward system rewards those participants who perform in the desired manner. Reward systems are the device by which organizations are conceptually assured that their controls will be effective. Rewards also provide the organization with the means of recognizing and dealing with deviant behavior. However, the assumptions regarding human behavior implicit in the traditional reward-based control systems often result in dysfunctional reactions by organizational participants. Blau and Scott point out one possible dysfunctional outcome of the traditional reward-based control system as bureaucratic behavior—behavior that is called for by the control system but which is dysfunctional with regard to generally agreed upon goals of the organization. Participants behave bureaucratically for the simple reason that such behaviors enable them to have favorable ratings on the evaluative measures of their activities taken by the control systems.

Performance evaluation is the essential factor in insuring organizational control. It enables the organization to determine if

37 Chris Argyris, Personality and Organization (New York: Harper and Row, Publishers, 1957) points out that traditional reward-based control systems seem to assume that:
1. Man is rational and motivated to maximize his economic gain.
2. Man is not a social animal.
3. Man can be treated in a standardized manner.
4. Man needs to be stimulated by management if he is to work.


39 James G. March and Herbert A. Simon, Formal Organizations: A Comparative Approach (New York: John Wiley and Sons, Inc., 1958) have summarized the views expressed by a number of sociologists regarding this phenomenon.
and insure that decisions are being made in a manner that will best contribute to the accomplishment of the organization's objectives. This means that performance evaluation must be such as to make consistent the goals of the organizational participants and the goals of the organization. Towards this end, both the philosophy and procedures of organizational evaluation have a significant influence on behavior. Caplan outlines the major phases that comprise the evaluation process as follows:

2. Establishment of criteria for relating the performance of division managers to the accomplishment of organization objectives.
3. Development of procedures for measuring operating results in terms of performance criteria.
4. Communication of organization objectives, performance criteria and measurement procedures to division managers.
6. Establishment and use of feedback processes so that division managers are informed of the results of the evaluation process.

The accounting system is directly involved in providing information pertinent to performance evaluation. It provides budgets against which actual performance can be compared, it furnishes performance reports that quantify organizational outcomes that result

from organizational participant activities, and it identifies the
profit or cost centers that are responsible for those quantified
outcome reports. The basic events that are involved in providing
information regarding performance include the following:

1. The selection of certain aspects of behaviors relevant to
the organization for measurement.

2. The establishment of standards against which actual
performance can be compared.

3. The measurement of actual performance regarding those
aspects of organizational behavior that have been selected
as relevant.

Performance measurements are significant to organizations for
a number of reasons. They serve as control devices that report how
the individual or organizational unit is proceeding toward or contribu-
ting to the organizational goals. Second, performance measurement can
serve as an integrative mechanism between individual goals and organi-
zational objectives by relating individual effort to organizational
incentives. 41 Third, performance measurements can serve as psycholo-
gical rewards in themselves. Studies by Marx and Witter 42 and by

41 These organizational incentives can involve material or
psychological rewards. Among the psychological rewards available to
the organization are social approval and support, job security,
responsibility, autonomy and feedback of information.

42 Melvin H. Marx and David W. Witter, "Repetition of
Correct Responses and Errors as a Function of Performance with
Reward or Information," Journal of Experimental Psychology (1972),
92, pp. 53-58.
Estes have indicated that information affects performance apart from its connective effects between rewards and performance.

The effects of performance measurements upon the behavior of organizational participants involve two stages. In the first stage, performance reports are transmitted to and interpreted by the participant manager and his superiors. In the second stage, the interpretation of performance reports by superiors are translated into action; that is, into superior interaction with subordinates. In this study, attention will be concentrated upon the first stage since it includes those variables which are of greatest interest.

The literature review in Chapter Two will present evidence in support of the hypothesis that performance measurements affect organizational performance. In order to develop an understanding of the association between performance measurements and the organizational control system, two situations will be considered for which diagrammatic representations of the relationships will be constructed. The two situations under consideration are an "ideal" situation and an "imperfect" situation. There are obviously other possibilities than these two situations considered here, but these two situations should be sufficiently representative of the relationship between performance measurements and the organizational control system for explanatory purposes.

---

In order to facilitate an understanding of Figure 1 (the "ideal" situation) and Figure 2 (the "imperfect" situation), the symbols utilized in the two figures will be described briefly. Boxed variables indicate inputs into the system that either direct or affect organizational behavior. Circled variables indicate organizational outputs or outcomes that result from actions, activities or behaviors of organizational participants. \( B_0 \) refers to organizational outcomes desired by the system. These include tangible outputs (products) as well as various forms of behavior exhibited by organizational participants such as reliability, loyalty or compliance. \( B_1 \) refers to the actual organizational outcomes that result from the aggregate of organizational participant behaviors. Once again, these outcomes include both end-result output variables such as profitability and productivity and intermediate behavioral variables such as loyalty and compliance. \( B_a \) denotes all actual organizational outcomes. \( B_a \) differs from \( B_1 \) insofar as it also includes organizational outcomes that result from forces external to the organization such as governmental agencies. \( B_m \) represents organizational outcomes measured by the accounting systems such as profitability. Single, straight lines in the figures denote a causative relationship in the direction of the arrow between the joined variables. Double lines indicate actions, activities and behaviors engaged in by organizational participants. Broken lines represent feedback provided by the accounting system. Accounting feedback can include intermediate variable measures as well as end-result measures. Finally, the bent line denotes an indirect relationship, notably between measured
organizational outcomes and organizational rewards in Figure 2. This particular relationship is indirect because rewards merely follow performance and are not necessarily influenced in amount or degree by the quality of performance.

In the ideal situation represented by Figure 1, rewards (Box 3) would be based on organizational objectives. This is indicated by the single line joining organizational objectives to organizational rewards. The rewards received by an individual manager would therefore depend on the degree to which his performance fulfilled the objectives of the organization. This relationship is illustrated by the straight line joining \( R_i \), the actual organizational outcomes that result from the individual participant's actions or behaviors, to organizational rewards. In turn, the rewards serve to integrate the manager's goals with the objectives of the organization as is indicated by the straight line joining rewards to individual goals. Since rewards are directly related to performance, the manager's behaviors should be concentrated toward the fulfillment of organizationally desired objectives to qualify him for organizational rewards. Thus, organizational goals (Box 1) and individual managers' goals (Box 1a) are congruent in this ideal situation. The congruence of the two goals is illustrated by the attached nature of the two variables.

Organizational goals are interpreted by the accounting system into the quantified objectives which comprise performance budgets (Box 2). Since this interpretation requires actions by accountants, organizational goals and performance budgets are joined by a double
Figure 1. The internal accounting process in an ideal planning and control system.

\( B_0 = \text{organizationally desired outcomes} \)

\( B_1 = \text{organizational outcomes that result from behaviors engaged in by the organizational participants} \)

\( B_a = \text{all actual organizational outcomes} \)

\( B_m = \text{organizational outcomes measured by the accounting system} \)

causative relationship
actions, activities or behaviors
feedback
line. Performance budgets will inform the individual participants of organizational objectives. This relationship is indicated by the single line connecting performance budgets to individual goals. In addition, performance budgets will largely determine what organizational outcomes will be measured by the accounting system following performance ($B_m$). This relationship is indicated by the single line joining performance budgets to $B_m$.

Individual goals will be translated by each organizational participant into organization-related behaviors. This is illustrated by the double line, denoting action, which joins individual goals to $B_i$. In the ideal system, $B_i$, $B_m$, $B_o$ (organizational outcomes desired by the organization) and $B_a$ (all actual organizational outcomes) coincide perfectly. All outcomes are controllable by organizational participants, all organizational goals are embraced by organizational participants, all outcomes resulting from participant behaviors are those desired by the organization, all organizationally desired outcomes are fulfilled by organizational participants and all desired organizational outcomes are measured by the accounting system.

The accounting activities in the ideal system involve (1) the preparation of performance budgets which are based on specific organizational goals and which should include all the significant quantifiable activities necessary to accomplish specific organizational objectives, and (2) the measurement of those behaviors outlined in the performance budget. Performance reports are utilized to revise performance budgets and organizational goals as necessary. This is indicated by the dotted line joining $B_m$ to performance budgets and
organizational goals. In addition, accounting reports will inform the individual participants of the quality of their performance as measured by the control system.

Ideal situations are conceptually satisfying. However, they do not coincide with reality since (1) organizational rewards are usually not directly related to performance, (2) all the specific behaviors necessary to achieve organizational objectives are not known, (3) measurements for many of the behaviors and consequences desired by the organization are not established, (4) organizationally desired outcomes and those measured by the accounting system are not likely to coincide perfectly, and (5) individual and organizational goals are unlikely to be perfectly congruent. A closed system free of uncertainty would be necessary in the ideal situation. It should be noted that a circumstance in which organizational behaviors are specifically prescribed may not be desirable insofar as it may restrict the creative ability of the manager in applying individual solutions to specific problems or in coping with unusual situations.44

A more likely situation is one in which many imperfections exist in the goal, performance, reward and measurement systems of the organization. This situation is illustrated in Figure 2. In this imperfect situation, rewards (Box 5) are not directly, or perhaps

44 Anthony, Planning and Control Systems: A Framework for Analysis, pp. 28-30, refers to this as the conformance fallacy and suggests that individual decisions are desirable to the extent that the manager can make decisions that are better than those implied in the plans. Thus control aimed at assuring results that conform as closely as possible to plans is not necessarily consistent with optimal organizational performance.
Figure 2. The internal accounting process in an imperfect planning and control system.
even closely, related to good performance as is indicated by the absence of a line joining organizational rewards to organizational goals. When rewards are not closely related to performance, managers may tend to concentrate on their own goals, giving them preference over organizationally desirable goals if the objectives should conflict. Thus a lack of congruence between individual and organizational goals is likely since organizational rewards fail to integrate individual goals (Box 3) to organizational objectives (Box 1).

As in the ideal system, organizational goals are interpreted by the accounting system into quantified performance budgets, indicated by the double line joining organizational goals to performance budgets. These budgets will influence individual goals as is indicated by the single line joining budgets to individual goals. Organizational goals will also still affect individual goals to some degree, indicated by the single line connecting organizational goals to individual goals.

In addition to organizational goals and performance budgets, individual goals in the imperfect situation are also influenced by a number of other factors. These factors include organizational rewards, performance reports and a behavioral group of variables involving superior and peer relationships and individual motivations, abilities and perceptions. All these factors that affect individual goals result in the manifestation of organization behaviors, indicated by the double line joining individual goals to B₁. In an imperfect system, some organizational outcomes of participant behaviors will be desired by the organization, but others will not be desirable, which explains why B₁ and B₀ overlap but are not congruent. Examples of outcomes not
desired by the organization include worker slowdowns, sabotage and absenteeism. Furthermore, organizational outcomes of participant activities ($B_1$) also constitutes only a subset of the actual consequences that ensue to the organization due to some outcomes which will arise from forces external to the organization.

In an imperfect situation, accounting activities are also less than perfect. Performance budgets may be based on some organizational goals but not necessarily all of them. Performance measurements also fail to report on every important dimension of organization outcomes. Examples of omitted measures in most accounting reports are the intermediate performance variables or the human resources variables and sub-optimal decision measures.

In imperfect situations, measured outcomes may or may not determine what organizational rewards will be awarded to participants. Generally, tangible organizational rewards are established contractually and are not contingent upon the quality of performance - particularly in the lower echelons of the organization. This is indicated in Figure 2 by the best line joining $B_m$ to organizational rewards. Organizational rewards are meaningful in this situation, only insofar as they are perceived to be adequate for continued individual participation in the organization. If an organizational participant regards the organizational rewards as inadequate, the degree of his participation in the organization could decrease (through lowered individual goals) or his participation in the organization could be terminated.
Finally, performance measures are conveyed to the manager's superiors and to the individual participant-manager himself. Performance reports are transmitted to the manager's superiors for possible goal and budget reformulation and for the evaluation of the manager's performance. This is indicated by the dotted line joining $B_m$ to organizational and individual goals, to performance budgets and to superior-, peer- and individual-related factors. As has been stated previously, the manner in which superiors interpret performance data and convey their judgments to the appropriate subordinate is beyond the scope of the current study.
CHAPTER TWO

REVIEW OF PERTINENT LITERATURE

I. The Accounting Approach to Performance Reporting

The available evidence indicates that accountants have absorbed the classical view of human behavior in organizations although the behavioral assumptions of management accounting are not expressly stated in the literature. Behavioral considerations may not have been considered explicitly in the design of accounting practice but accounting procedures, systems and attitudes have implicitly been shaped by the traditional views of human behavior in business organizations as was discussed in Chapter One. To understand the implicit behavioral assumptions underlying accounting practice, a brief review of traditional views of organizational behavior will be undertaken.

Classical management theory is based on the economic theory of profit maximization which considers the primary objective of business activity to be profit maximization. The principal role of the business manager is viewed as the maximization of organizational profits. The organization offers participants economic inducements to work towards the primary objective of profit maximization.

The economic theory of profit maximization provided the philosophical and psychological foundations of scientific management.
theory at the beginning of the twentieth century. Scientific management combined the basic views of the economic theory of the firm with the engineering objective of effecting the maximum utilization of available physical resources. Frederick Taylor was the innovator of the scientific management movement of maximizing worker productivity through increased efficiency and reduced costs.\(^1\) Taylor's techniques are described in the following passage by March and Simon.

It takes the point of view of the engineer rather than the natural scientist, and prescribes procedures for the efficient organization and conduct of routine work. Taylor's principal prescriptions were three:

1. Use time and methods study to find the "one best way" of performing a job. By the best way is meant the way that permits the largest average rate of production over the day.

2. Provide the worker with an incentive to perform the job in the best way and at a good pace. In general, do this by giving him a specified bonus over day rates if he meets the standard of production.

3. Use specialized experts (functional foremen) to establish the various conditions surrounding the worker's task — methods, machine speeds, task priorities, etc.\(^2\)

Taylor's work was followed by the development of "principles of management" dealing with specific subjects such as lines of authority and responsibility, specialization, span of control and unity of command.\(^3\) The primary concern of the students of principles

---


3 Examples of the management principles of Henri Fayol and others can be found in Koontz and O'Donnell, *Principles of Management*.
of management was the efficient assignment of organizational activities to individual jobs and the grouping of these jobs by departments in such a way as to minimize the total cost of activities to the organization. The emphasis was on control and departmental responsibility and accountability.

The assumptions regarding human behavior and organizational goals of classical management theory are of interest to accounting since these assumptions were built into the design of traditional accounting control systems. The patterning of accounting practice after classical theory unduly restricts the role of management accounting to providing a limited and inadequate range of data for decision-making. The classical view of the one organizational objective of profit maximization permits only a narrow segment of the total organizational activity to be observed and ignores many of the complexities and interrelationships that transpire in the organization. Evidence for the contention that traditional management accounting is built on the profit maximization concept (and relatedly, on cost minimization) lies in the activities of most management accounting systems: selecting, processing and reporting data concerning certain economic events, the effects of which can readily be reduced to monetary terms.


Colembiewski\(^5\) cited some principles of traditional theory of organizations whose effects are clearly reflected in the purposes, procedures and problems of accounting. These principles include such propositions as:

work must be specialized in terms of functions at upper levels of organizations and in terms of processes at lower levels;

authority must be delegated by a single head to a sharply limited number of subordinates; and

supervision must be detailed and continuous.

Caplan's\(^6\) summary of classical management theory assumptions are listed in Table One.\(^7\) In recognition of the limitations of the behavioral assumptions incorporated into traditional accounting control systems, Caplan offered an alternative set of behavioral assumptions for management accounting which would incorporate modern organization theories. These assumptions are provided in Table Two.

Simon, Guetzkow et al.\(^8\) outlined three types of questions that may be taken to outline the full range of challenges facing internal

---


\(^6\) Caplan, Management Accounting and Behavioral Science, p. 17.

\(^7\) A more detailed discussion of the influence of classical management theory on accounting practice can be found in Caplan, Management Accounting and Behavioral Science, Chapter Two.

Table 1. Behavioral Assumptions of the Traditional Management Accounting Model of the Firm (From Edwin H. Caplan, Management Accounting and Behavioral Science, Reading, Mass.: Addison-Wesley Publishing Company, 1971, p. 17)

I. Assumptions about Organization Goals
   A. The principal objective of business activity is profit maximization.
   B. This principal objective can be segmented into subgoals to be distributed throughout the organization.
   C. Goals are additive - what is good for the parts of the business is also good for the whole.

II. Assumptions about the Behavior of Participants
   A. Organization participants are motivated primarily by economic forces.
   B. Work is essentially an unpleasant task which people will avoid whenever possible.
   C. Human beings are ordinarily inefficient and wasteful.

III. Assumptions about the Behavior of Management
   A. The role of the business manager is to maximize the profits of the firm.
   B. In order to perform this role, management must control the tendencies of employees to be lazy, wasteful and inefficient.
   C. The essence of management control is authority. The ultimate authority of management stems from its ability to affect the economic reward structure.
   D. There must be a balance between the authority a person has and his responsibility for performance.

IV. Assumptions about the Role of Management Accounting
   A. The primary function of management accounting is to aid management in the process of profit maximization.
   B. The accounting system is a goal-allocation device which permits management to select its operating objectives and to divide and distribute them throughout the firm, i.e., assign responsibilities for performance. This is commonly referred to as "planning."
   C. The accounting system is a control device which permits management to identify and correct undesirable performance.
   D. There is sufficient certainty, rationality, and knowledge within the system to permit an accurate comparison of responsibility for performance and the ultimate benefits and costs of that performance.
   E. The accounting system is neutral in its evaluations - personal bias is eliminated by the objectivity of the system.
Table 2. Behavioral Assumptions from Modern Organization Theory
(From Edwin H. Caplan, Management Accounting and Behavioral
Science, Reading, Mass., Addison-Wesley Publishing Company,
1971, pp. 30-31).

I. Assumptions about Organization Goals

A. Organizations are coalitions of individual participants.
Strictly speaking, the organization itself, which is mind-
less, cannot have goals - only the individuals can have
goals.

B. Those objectives which are usually viewed as organization
goals are, in fact, the objectives of the dominant members
of the coalition, subject to whatever constraints are
imposed by the other participants and by the external
environment of the organization.

C. Organization objectives tend to change in response to:
(1) changes in the goals of the dominant participants;
(2) changes in the relationships within the coalition; and
(3) changes in the external environment of the organization.

D. In the modern complex business enterprise, there is no
single universal organization goal such as profit maximiza-
tion. To the extent that any truly overall objective might
be identified, that objective is probably organization
survival.

E. Facing a highly complex and uncertain world and equipped with
only limited rationality, members of an organization tend to
focus on "local" (i.e., individual and departmental) goals.
These local goals are often in conflict with each other. In
addition, there appears to be no valid basis for the assump-
tion that they are homogeneous and thus additive - what is
good for the parts of the organization is not necessarily
good for the whole.

II. Assumptions about the Behavior of Participants

A. Human behavior within an organization is essentially an
adaptive, problem-solving, decision-making process.

B. Organization participants are motivated by a wide variety of
psychological, social, and economic needs and drives. The
relative strength of these diverse needs differs between
individuals and within the same individual over time.

C. The decision of an individual to join an organization, and
the separate decision to contribute his productive efforts
once a member, are based on the individuals' perception of
the extent to which such actions will further the achieve-
ment of his personal goals.

D. The efficiency and effectiveness of human behavior and
decision making within organizations is constrained by: (1)
the inability to concentrate on more than a few things at a
time; (2) limited awareness of the environment; (3) limited
knowledge of alternative courses of action and the consequences of such alternatives; (4) limited reasoning ability; and (5) incomplete and inconsistent preference systems. As a result of these limits on human rationality, individual and organization behavior is usually directed toward attempts to find satisfactory - rather than optimal - solutions.

III. Assumptions about the Behavior of Management

A. The primary role of the business manager is to maintain a favorable balance between (1) the contributions required from the participants and (2) the inducements (i.e., perceived need satisfactions) which must be offered to secure those contributions.

B. The management role is essentially a decision-making process subject to the limitations on human rationality and cognitive ability. The manager must make decisions himself and must effectively influence the decision premises of others so that their decisions will be favorable for the organization.

C. The essence of management control is the willingness of other participants to accept the authority of management. This willingness appears to be a nonstable function of the inducement-contribution balance.

D. Responsibility is assigned from above and authority is accepted from below. It is, therefore, meaningless to speak of the balance between responsibility and authority as if both of these were given to the manager by the formal organization.

IV. Assumptions about the Role of Management Accounting

A. The management accounting process is an information system whose major purposes are: (1) to provide the various levels of management with data which will facilitate the decision-making functions of planning and control; and (2) to serve as a communications medium within the organization.

B. The effective use of budgets and other accounting planning and control techniques requires an understanding of the interaction between these techniques and the motivations and aspiration levels of the individuals to be controlled.

C. The objectivity of the management accounting process is largely a myth. Accountants have wide areas of discretion in the selection, processing and reporting of data.

D. In performing their function within an organization, accountants can be expected to be influenced by their own personal and departmental goals in the same way that other participants are influenced.
reporting.

1. Score-card questions: "Am I doing well or badly?"

2. Attention-directing questions: "What problems should I look into?"

3. Problem-solving questions: "Of the several ways of doing the job, which is best?"

Score-card questions have attracted most of the attention from accounting reporting systems due to their relevance to traditional organization theory. According to Coelmbiewski, score-card reports have encouraged a separatism to develop among organizational subunits, creating problems regarding the integration of effort toward overall organizational objectives. Conversely, score-card data must often be used in attempts to force the integration of operations resulting from the traditional theory of organization in practice and from the score-card reports themselves. Integration is attempted by utilizing the score-card data in punitive fashion to assign responsibility in the absence of cooperative effort. Punitively-biased score-card practices tend to induce mechanisms of defense and self-protection among individuals in the organization, generating organizationally sub-optimal behavior.

Many management accounting techniques directed toward profit maximization through cost control often create feelings of confusion, frustration, suspicion and hostility. Organization members are

---


10 Chris Argyris, "Human Problems with Budgets," Harvard
often subject to evaluations based on information provided by the accounting system, whose apparent precision and exactness they find difficult to understand or explain. Further problems ensue in situations where management accountants view their function as primarily one of criticizing the actions of others and of placing the responsibility for failures on particular individuals.\textsuperscript{11}

Another dysfunctional behavioral outcome of accounting practice is that the provision of inadequate measurements often leads to erroneous or sub-optimal decisions.

The present practice of [measuring] closely only the level of performance of the end-result variables such as production, sales, costs, and earnings is leading to faulty conclusions as to what kinds of management and leadership yield the best results. What often confuses the situation is that pressure-oriented, threatening supervision can achieve impressive short-run results, particularly when coupled with high technical competence. ...Such results, however, are obtained at a substantial and serious cost to the organization.\textsuperscript{12}

Under the assumptions regarding the role of management accounting in Table One, the accounting system is described as a control device which permits management to identify and correct undesirable performance. Towards this end, accounting systems have relied primarily on the concept of management by exception - the drawing of attention to situations that have not been "in control." This approach enables the time-pressed executive to

\textsuperscript{11} Business Review (January-February 1953), pp. 97-110.

\textsuperscript{12} Ibid., pp. 97-110.

\textsuperscript{12} Likert, New Patterns of Management, pp. 61-62.
concentrate his attention and effort on significant deviations from expected results. Management by exception, therefore, is the vehicle which presumably keeps "the company ship on course." It is also the basis upon which budgets and performance reports have usually been established.

Although the concept of management by exception includes both favorable and unfavorable exceptions, the emphasis appears to be on unfavorable variances. Golombiewski contends that score-card reports of how well or poorly some person or unit in an organization is doing which are patterned after the classical theory of organizations have a punitive bias. While management by exception enables the manager to allocate his time in accordance with important deviations from expected results, it also directs his attention consistently toward the negative aspects of his own or his unit's performance - toward those situations that have not been "in control."

Actual results that correspond with the standards require little attention. The exceptions, however, are emphasized.

[Management by exception] reflects the needs of managers who want their attention directed to unusual situations and who do not want to be bothered about the smoothly running phases of operations.

Management by exception, in its simplest form, is a system of identification and communication that signals the manager when his attention is needed; conversely, it remains silent when his attention is not required. The primary purpose of such a system is, of course, to simplify the management process itself—to permit a manager to find the problems that need his action and to avoid dealing with those that are better handled by his subordinates.  

The subordinate is evaluated on the basis of deviations from successful task performance as communicated through the budget.

Although management by exception appears to be generally accepted, little is known about the ramifications of what appears to be a largely negative form of feedback information. Some studies on feedback suggest that negative forms of feedback have disruptive effects upon performance. The General Electric study found that criticism in the appraisal process had a negative effect on goal achievement. Studies in operant conditioning have found positive reinforcements to influence productivity positively while negative reinforcements detracted from productivity in the long-run. Researchers in learning have also generally agreed that "behaviors which are rewarded are more likely to occur" while threat and


punishment "may set up avoidance tendencies which prevent further learning."\(^{21}\)

One experimental study was located that investigated selected behavioral variables involved in a standard cost variance control system. Ansari\(^{22}\) studied effects of the form and content of variance reports in a laboratory experiment. His major conclusions were (1) that variance reports can affect worker satisfaction with supervisors by associating some of the positive or negative attributes toward a report with the supervisor using that report, and (2) that providing variance information to supervisors who are perceptually not ready to receive it can cause a decline in productivity by disturbing the equilibrium of a control system.

The above studies suggest that negative forms of feedback may have detrimental effects on performance - not only in terms of current productivity, but also in terms of attitudes and motivations. Since management by exception appears to focus on the negative aspects of feedback it seems relevant to determine what effects, if any, such an orientation in reporting may have on organizational behavior. For the purposes of this study, management by exception (and exception reporting) will be defined narrowly so as to apply


only to those circumstances in which variances are negative.

In summary, a substantial amount of theoretical and empirical research in modern organization theory demonstrates that the classical view may not be an efficient approach in motivating organizationally desirable behavior. Yet traditional accounting practice has been based on this same theory - classical influence on management accounting is evident in the internal reporting practices of accounting systems. It is important that management accounting systems discard those classical assumptions that may be organizationally detrimental and incorporate the behavioral assumptions of modern theories of organization behavior. Since a major classically-oriented accounting practice is management by exception which involves negatively-oriented forms of feedback, relevant literature on feedback will be reviewed briefly.
II. The Behavioral Effects of Feedback

Definition of Feedback

A review of the psychological literature indicates that the term feedback (or knowledge of results) appears to be used generically in most studies to refer to any information dependent upon what an individual has done and which is directed back towards that person. However, as Bilodeau and Bilodeau\textsuperscript{23} point out "laws such as }R = f(KR)\text{ have been sought by some - but there is no agreement on the definition of }KR\text{ (knowledge of results), never mind the function. In fact, there is not even widespread agreement as to name."\textsuperscript{24}

Different types of feedback have been studied - mostly based on different degrees of accuracy and/or specificity regarding either the correct response or the subject's performance or both.\textsuperscript{25} Castellan,\textsuperscript{26} for example, subdivided feedback into three types: (1) outcome feedback - the "correct" response; (2) feedback on the subject's performance - information concerning the way in which the cues were being weighted by the subject; and (3) feedback concerning the structure of the ecology in which judgments were being made - information


\textsuperscript{24} Ibid., p. 250. The term }R\text{ in the equation }R = f(KR)\text{ refers to the behavior response.


\textsuperscript{26} N. John Castellan, Jr., "The Effect of Different Types of Feedback in Multiple-Cue Probability Learning," Organizational Behavior and Human Performance (1972), 8, pp. 340-346.
concerning the manner in which the cues should have been weighted based on the conditional probabilities of events given the cue. In comparison, Lott, Schopler and Gibb\textsuperscript{27} distinguished between feeling-oriented feedback which deals with personal interactions of group members, and task-oriented feedback which deals with the degree of accomplishment of the group task.

There are also differing opinions regarding the functions of feedback. Brown\textsuperscript{28} considered three roles of knowledge of results: (1) reward that reinforces or strengthens a habit, (2) information that evokes already established habits (cue properties), and (3) motivation that provides the incentive for learning or performing. Vroom\textsuperscript{29} also lists three functions for knowledge of results in a task situation: (1) the cue function that increases the probability of arousal of correct expectancies concerning the consequences of actions for successful task performance, (2) the learning function that increases the strength of correct expectancies concerning the consequences of actions for successful performance and decreases the strength of incorrect expectancies, and (3) the motivational function that increases the valence of successful performance. Payne and Hauty\textsuperscript{30} discussed two functions that feedback can have on

\begin{itemize}
  \item In Bilodeau and Bilodeau, "Motor Skills Learning."
  \item Vroom, \textit{Work and Motivation}, p. 239.
  \item R. B. Payne and G. T. Hauty, "The Effects of Experimentally
\end{itemize}
performance: (1) the directive function which keeps goal-directed behavior "on course" and (2) the incentive function which stimulates employees to greater effort. Similarly, Deese and Hulse find two functions of feedback: (1) to inform the learner about his responses which permits him to correct them on the following trial and (2) to provide reinforcement. Generally, the feedback studies indicate that there are at least two main functions of feedback: a directive function and an incentive (or motivational) function.

Studies on Feedback

The facilitative effect of feedback on behavior is a well-established finding. Bilodeau and Bilodeau summarized studies on feedback as showing the following: no improvement without knowledge of results, progressive improvement with it and deterioration caused by lags in feedback of even less than 1.0 seconds and greatly enhanced performance with supplementary and quickened feedback.


33 Bilodeau and Bilodeau, "Motor Skills Learning."
Among Ammons' list of empirical generalizations were the following: (1) almost universally, where knowledge of performance is given to one group and withheld or reduced in another, the former group learns more rapidly and reaches a higher level of proficiency, (2) knowledge of performance affects motivation, (3) the more specific the knowledge of performance, the more rapid the improvement and the higher the level of performance (up to an optimum point of specificity) and (4) the longer the delay in giving feedback the less effect the given information has, with an optimum delay for every task and every stage of learning as a possibility.

The literature has therefore generally shown that feedback leads to improved performance. However, the feedback studies have also generally used simple tasks with straightforward, unidimensional feedback (for example, time on target in a rotor pursuit task) which may raise some problems when generalizing the feedback findings to more complex work situations. Furthermore, the majority of studies have focused on the directive function of feedback, particularly in the learning situation, establishing the connection between directive feedback and performance. The effect of the incentive function of feedback is somewhat less well established although it appears to have some effect on performance as well.

In his review of the feedback literature, Ammons suggested that the most common effect of feedback is to increase motivation.

34 Ammons, "Effects of Knowledge of Performance: A Survey and Tentative Theoretical Formulation."

35 Ibid.
Among the findings that support this suggestion were the following: subjects deprived of feedback were more bored, more often late to experimental sessions and less careful on the job; subjects given feedback found their task more interesting; and subjects given feedback were observed to have a more favorable general attitude toward the experiment in which they participated.

The present study is concerned mainly with the incentive function of feedback although, as Locke, Cartledge and Koeppel point out, feedback that directs or cues can indirectly affect motivation. In the following sections, selected studies specifically related to the incentive function of feedback will be reviewed briefly.

Effects of Success and Failure on Feedback

Bilodeau and Bilodeau's review of studies on feedback indicate mixed results regarding the effects of experimentally induced success and failure on performance. For example, in some studies experimentally induced failure resulted in decrements in performance while in other studies it was related to higher levels of performance. Also, some studies suggest that there is an overall tendency for greater


37 Locke, Cartledge and Koeppel also indicate that the converse is not necessarily true and therefore it is possible to isolate the effects of the incentive function of feedback although few studies have done so.

38 Bilodeau and Bilodeau, "Motor Skills Learning."
effort exerted when subjects were informed that they were relatively close to their goal than when they were informed that they were far from the goal.

It appears, then, that information regarding performance may either increase or decrease subsequent efforts. There are indications that other variables may be involved - for example, a subject told he has performed poorly may become discouraged or may be spurred on to increase his efforts while a subject receiving good performance reports may relax or may try to do even better. On the other hand, since failure or success was induced by the experimenter in these studies, subjects may not have accepted the feedback information that they received from the experimenter as valid reflections of their abilities and/or performance. For example, Cummings, Schwab and Rosen, finding that future goal levels set by subjects would increase as a function of the amount and accuracy of feedback, concluded that providing employees with incomplete or erroneously low feedback (on the assumption that it would motivate them to perform better) may actually result in poorer performance than providing no feedback at all. Argyris' studies led him to conclude that feelings of failure result in various dysfunctional effects. These include losing interest in one's work, lowering one's standards of achievement, losing self-confidence, refusing


40 Argyris, "Human Problems with Budgets."
to try new methods or to accept new jobs and developing a tendency to blame others and be overcritical of the work of others.

Effects of Praise and Criticism

With the reasoning that praise is a form of ego satisfaction, Maier\(^41\) suggests that praise can motivate employees. He acknowledges both praise and reprimands can facilitate learning in that they teach which acts lead to success and which acts to failure. However, Maier believes supportive behavior may act favorably on morale whereas critical comments may tend to isolate the individual. He cites a study on college students which showed praise of work produced significantly improved work while various expressions of disapproval showed more subjects having poorer results.

Meyer, Kay and French\(^42\) also found that criticisms in the annual appraisal of an employee's performance had negative effects on goal achievement. The average subordinate in their study reacted defensively over fifty per cent of the time when criticized. Defensiveness resulting from critical appraisal produced inferior performance - those receiving a greater number of criticisms generally showed less goal achievement ten to twelve weeks later than those who had received fewer criticisms, and the authors rarely observed constructive responses to criticism. They also found that praise had little effect in the annual appraisal setting, although


\(^{42}\) Meyer, Kay and French, "Split Roles in Performance Appraisal,"
this may have resulted from the fact that praise was more often related to general performance characteristics while criticism usually focused on specific performance items.

In their study involving incentives, positive and negative feedback, and public and private feedback, Butler and Jaffee found that the positive and negative feedback factor had the greatest effect. Positive feedback made the subjects who were appointed leaders of the experimental groups more task-oriented while negative feedback made leaders more disagreeable, tense and antagonistic towards other members of his group. Davis and Lamberth also found that evaluative statements (positive and negative) aroused positive and negative affect respectively.

Day and Hamblin's study of close and punitive styles of supervision indicated that punitive supervision produced significant decreases in productivity and increased verbal aggression toward the supervisors. Although this study did not directly involve feedback, punitive supervision was defined as involving the intentional, conscious use of aggression to gain the compliance of subordinates (for example, reprimands).


The implication of these studies, that criticism or disapproval is detrimental to performance and morale, is not surprising. The literature indicates that when shaping a skill (that is, in learning situations), the use of rewards is most efficient.\(^{46}\) This follows the operant conditioning paradigm of systematic reinforcement of desired behaviors while ignoring or exercising negative reinforcement to unwanted behaviors.\(^{47}\) Generally, punishment which is one form of negative reinforcement is not recommended since its results tend to be of short duration and often result in undesired reactions. While the feedback studies have not shown conclusively that praise improves performance and criticism detracts from it, they do suggest that positive forms of reinforcement positively affect performance and negative forms of reinforcement negatively affect performance; these suggestions being supported by studies in learning and operant conditioning.

Effects of Achievement Motivation

Some studies indicate that achievement motivation may intervene in the feedback-performance relationship although the relationships between achievement motivation and positive and negative forms of feedback were not considered in any of the studies reviewed and


therefore have yet to be established. Wendt\textsuperscript{48} found that only those subjects characterized by low achievement motivation increased their performance when pressure was put on them to do a good job. Subjects with high achievement motivation did not shift their behavior when such pressure was applied.

In an experiment involving groups of four subjects working on a story assembly problem, French\textsuperscript{49} found that groups composed of members with high achievement motivation responded with better performance to task feedback than to feeling feedback --- the opposite to groups composed of members with high affiliation motivation. Task feedback dealt with the degree of accomplishment at the group task, while feeling feedback involved the personal interaction of group members. Steers and Porter\textsuperscript{50} reported that feedback was significantly and positively related to effort and performance for those subjects with high needs for achievement, affiliation and independence. No relationship was found for subjects rated low on these three needs.


Clarke\(^{51}\) examined the effects of feedback and achievement motivation in a study involving an insolvable figure tracing task. His results indicated that feedback was highly significant in promoting persistent behavior and that subjects high in achievement and low in affiliation needs persisted longest at the task and estimated the highest expectations of their own success on succeeding tasks. In the section on behavioral effects of task goals, studies by Atkinson\(^{52}\) and others regarding the relationship of other variables to achievement motivation are discussed.

Effects of Self-Esteem

Some studies have also indicated that another variable may have a significant moderating effect on the relationship between feedback and performance. Vroom\(^{53}\) cites various studies which have demonstrated that task performance is increased when subjects believe that the task measures a valued ability such as level of intelligence. Meyer, Kay and French\(^{54}\) found that critical comprehensive annual


\(^{53}\) Vroom, Work and Motivation.

\(^{54}\) Meyer, Kay and French, "Split Roles in Performance Appraisal."
performance appraisals disrupted subsequent performance most on those individuals low in self-esteem. Day and Hamblin\textsuperscript{55} also found that the subordinate low in self-esteem increased his aggressive feelings when confronted by close supervision.

\textsuperscript{55} Day and Hamblin, "Some Effects of Close and Punitive Styles of Supervision."
III. The Behavioral Effects of Task Goals

The nature of feedback results in its dependent relationship with assigned task goals against which performance is subsequently reported upon in feedback. The effects of performance reports cannot be dissociated from some criteria of evaluating the contents of the reports. The criteria against which performance is usually evaluated are the task goals, objectives or budgets stated at the outset of the activity period. Thus task goals cannot be overlooked in an investigation of the effects of feedback since goals, budgets or plans necessarily precede feedback. Depending on the nature of a particular budget, that budget may induce better performance from the members of an organization.

Differential goal setting, such as occurs in differential budget levels, appears to be an important factor in the feedback-performance relationship. The level at which a particular goal or budget is set apparently affects its ability to elicit desired performance. Laboratory research regarding goal difficulty (differential levels of goals set) has involved three major variables: aspiration levels, intentions, and performance.

Aspiration levels refer to the individual goals stated by the participant regarding how well he desires to do. They represent goals that, when just barely achieved, have associated with them subjective feelings of success; when not achieved, they have associated with them subjective feelings of failure.\(^{56}\) Intentions,
or choice behavior, refer to the goals of the individual as evidenced either by statements of intent regarding how well he intends to do or by actual choice behavior in the selection of the task he sets for himself. The differentiation of aspiration levels and intentions here results from Festinger's finding that differences between performance and aspirations were greater between performance and expressions of "like to get" than between performance and expressions of "expect to get." Performance refers to the organizational outcome resulting from the behavior of the individual participant. The relationships considered by researchers with respect to goal difficulty are schematically represented in Figure 3.

Although there appear to be few studies directly investigating the relationship between goal difficulty and aspiration level (B-1 in Figure 3), Atkinson has suggested that achievement motivation may intervene in this association. He theorized that motivation to achieve is strongest for achievement-oriented individuals when outcome uncertainty is greatest; that is, when the probability of success is fifty per cent. Atkinson refers to this situation as one of intermediate risk. On the other hand, failure-avoiding individuals in the intermediate risk situation would experience


58 Atkinson, "Motivational Determinants of Risk-Taking Behavior."
the greatest anxiety and prefer the easiest or most difficult task—
either of which would offer them greater outcome certainty of success
or failure respectively. Along the same vein, Child and Whiting suggested that based on their review of the literature, shifts in level of aspiration appear to be partly a function of the individual’s confidence in attaining his goals. Child and Whiting offered five general conclusions based on their review.

1. Success generally leads to a raising of the level of aspiration, failure to a lowering.
2. The stronger the success the greater is the probability of a rise in level of aspiration; the stronger the failure the greater is the probability of a lowering.
3. Shifts in level of aspiration are in part a function of changes in the subject’s confidence in his ability to attain goals.
4. Failure is more likely than success to lead to withdrawal in the form of avoiding setting a level of aspiration.
5. Effects of failure on level of aspiration are more varied than those of success.

The relationship between goal difficulty and intentions (R-2 in Figure 3) is often confused with the relationship between goal difficulty and aspiration level. For example, Zander uses the term

aspiration level when referring to intentions. With regard to the relationship between goal difficulty and intentions, Atkinson has demonstrated that individuals with high needs for achievement select tasks of intermediate difficulty in games such as shuffleboard, ring-tossing and basketball shooting. Zander, focusing his attention on groups rather than individuals, found choice behavior followed the rule of "succeed, raise; fail, lower" on a series of trials of repetitive tasks. The amount of shift in choice behavior was found to be greater after a success than after a failure. Zander also found that social pressures exerted from outside the group resulted in the selection of goal levels in the direction advocated by those exerting pressure on the group, although the actual production rate declined with such pressure. In addition, highly unified and cohesive groups were found to be more likely to select goal levels in the intermediate range of difficulty than were less unified and less cohesive groups.

With respect to the relationship between goal difficulty and performance (R-3 in Figure 3), Locke found that feedback alone does not affect performance and suggested performance differences might be due to different levels of motivation produced by different goals. Locke and Bryan demonstrated that performance goals do affect levels of performance over different tasks and that specific

61 Atkinson, "Motivational Determinants of Risk-Taking Behavior."
62 Zander, Motives and Goals in Groups.
63 Edwin A. Locke, "Motivational Effects of Knowledge of
performance goals improve performance level more than do general statements such as "do your best." Forward and Zander concluded from their study that setting unattainable goals has a detrimental effect on performance.

The relationship between levels of aspiration and intentions (R-4 in Figure 3) has received little attention, probably due to the similarity of the two variables. Forward demonstrated that when avoidance tendencies regarding success are stronger than tendencies to approach success, group members select goals that are less intermediate and less challenging. When approach tendencies are stronger than avoidance tendencies, members selected goals that had probabilities of success close to fifty per cent.

Locke, Locke, Bryan and Kendall and Feather studied the intentions-performance relationship (R-5 in Figure 3). Locke found


that the higher the level of intended achievement, the higher was the level of performance. Locke, Bryan and Kendall found the same goal level produced the same performance level regardless of whether or not incentives were offered for performance. Feather, investigating the persistence of individuals at difficult tasks found persistence positively related to initial estimates of success at the task for subjects high in achievement motivation and low in test anxiety.

Studies of the aspiration level-performance relationship (R-6 in Figure 3) indicate that an individual will attempt to perform at or above his level of aspiration. Bayton\(^7\) found that subjects with higher levels of aspiration followed with higher performance on arithmetic problems. Siegel and Fouraker\(^7\) found that subjects with high levels of aspiration gained more profits in a business game than subjects with low levels of aspiration.

The studies on task difficulty reviewed to this point have been limited in their investigation of the variables involved in the goal difficulty, aspiration level, intentions and performance relationships. Generally, they have isolated and studied pairwise


interrelationships only. However, there are a few investigations in budgeting that have integrated most of these variables under the auspices of a single study. These studies include those by Stedry,72 Stedry and Kay,73 and Hofstede.74

Stedry75 attempted to predict the effects of different budgets on actual performance by utilizing a series of algebraic "water-jar" problems. Stedry's four main experimental groups consisted of groups given low difficulty budgets, medium difficulty budgets, high difficulty budgets, and no budgets. His findings indicated that overall, the best performance was achieved by the group without a budget, followed by the medium budget group, the high budget group and finally the low budget group. Stedry's study further indicated that the order in which aspiration levels are formulated and budgets are assigned influences the effect of aspiration levels on performance. To investigate the relationship, Stedry further divided each of his four main groups into three subgroups. The subgroups which received budget information before being asked to state aspiration levels performed best, followed by the subgroup in which subjects were asked to state aspiration levels before being informed of the

72 Stedry, Budget Control and Cost Behavior.


75 Stedry, Budget Control and Cost Behavior.
budget. The third subgroup in which explicit aspiration level statements were not elicited displayed the poorest performance results. The best performance among all the experimental groups occurred in the high budget subgroup which had set its goals after receiving the budget, while the poorest performance occurred in the high budget subgroup given the budget after setting its goals. These results suggest that high difficulty goals are sensitive to other conditions which may cause the rejection of a particular goal.

In a subsequent study, Stedry and Kay\textsuperscript{76} studied the effects of goal difficulty on performance. Easy goals were those achieved fifty per cent of the time in the past and difficult goals were those achieved only twenty-five per cent of the time in the past. Their study confirmed the inferiority of goals considered impossible to attain as compared to easy or challenging goals. However, Stedry and Kay were unable to confirm the superiority of goals perceived as challenging over those perceived as easy. They did find that difficult goals resulted in extremes in performance; difficult goals perceived as challenging resulted in better performance; difficult goals perceived as impossible were associated with poor performance.

Hofstede's study\textsuperscript{77} considered various alternative budgets ranging in tightness from very tight to very loose. As budgets

\textsuperscript{76} Stedry and Kay, "The Effects of Goal Difficulty on Performance: A Field Experiment."

\textsuperscript{77} Hofstede, The Game of Budget Control.
became progressively tighter, individuals first adjusted their aspiration levels up toward the budgeted level. When the budget became so tight as to lead the individuals to believe that the attainment of the budgeted level was impossible, the subjects lowered their aspiration levels, increasing the difference between the budget level and the aspiration level. In summary, the goal difficulty studies indicate that up to a point, increasing goal difficulty increases the amount of effort expended toward achieving the goal.\(^78\) Field studies on goal difficulty have also generally supported the notion that more difficult goals lead to improved performance,\(^79\) but have also suggested that difficult goals may lose their sustaining power over time when they are not attained.\(^80\)


\(^{80}\) Zander and Newcomb, "Group Levels of Aspiration in United Fund Campaign."
IV. Concluding Remarks

The review of feedback literature indicates that information regarding results of performance is an important factor in shaping work behavior. There is some evidence to support the opinion that negative forms of reinforcement are inferior to positive reinforcements and may, in fact, be detrimental to overall performance. The role of feedback in relation to the accounting measurement process has been proposed in Figure 2, suggesting a close interrelationship between goals set (performance budgets), feedback (performance reports) and performance.

However, there appears to be a possibility that negative forms of feedback may be positively associated with task performance. For example, a curvilinear relationship between feedback and behavior has been suggested.\textsuperscript{81} Schroder et al.\textsuperscript{82} have suggested that environmental complexity (comprised in part by information load) and information processing complexity are curvilinearly related. They indicate that as environmental complexity increases, so does information processing abstractness, up to a critical level at which point information processing reaches a maximum. Increased environmental complexity beyond this critical level results in a decrease of information processing abstractness. This relationship


\textsuperscript{82} Schroder, Driver and Streufert, \textit{Human Information Processing}. 
is illustrated in Figure 4.

The curvilinear relationship is hypothesized between information processing abstractness and three environmental properties:

1. Input in a person's internal concepts or value (subjective information complexity),

2. Inputs that are rewarding (eucity), and

3. Inputs reflecting threat or failure (noxity).

The last property, noxity, is of interest to this study since it includes information that is critical of performance. If the theory of human information processing can be extended to behavior, its implications could be relevant to this study. The theory would suggest that all types of feedback will increase performance up to a certain level as opposed to the hypotheses offered in this study which suggest exception (negative) feedback will reduce performance.
CHAPTER THREE

THE EXPERIMENTAL STUDY

I. Theoretical Implications of Prior Research

The review of accounting literature in Chapter One indicated a need to incorporate behavioral implications into accounting theory and practice. The apparent need for behavioral considerations suggests that it may be useful to ascertain the organizational effects, if any, of accounting reports. Accounting reports, as discussed in Chapter One, tend towards critical evaluations of organizational participant performance.

Some budgeting studies have considered the behavioral implications of certain accounting-related situations. These studies investigated the implications of differing levels of goal difficulty which are of interest to this study. However, none of these studies investigated the effects of accounting feedback with its negative orientations which is of major interest in this inquiry.

The review of feedback research in psychology indicated certain difficulties in directly applying their research results to accounting. Most of these studies involved simple tasks such as subjects being required to lift weights with their index fingers or track objects and were accompanied by straightforward,
unidimensional feedback such as "Right" or "Wrong" by the experimenter. In general, the effects of feedback are not yet sufficiently understood such as to permit the development of a general theory on feedback which might permit direct applications to other situations such as accounting.

In studying the behavioral effects of accounting feedback, there were at least two directions that could be pursued. One alternative involved the traditional accounting approach toward performance reports which concentrates on such end-result measures as profitability and productivity. The other alternative involved the measurement of intermediate measures of organizational performance as was suggested by Argyris. Intermediate indicators of organizational performance are of interest to accounting systems since they are significant, either directly or indirectly, to the attainment of organizational objectives and since a major function of management accounting is the measurement of organizational performance. For these reasons, it was decided that both types of performance measures should be considered in the current study. On a practical level, it was impossible to consider all possible end-result measures and all possible measurable intermediate behavior indicators. It was therefore necessary to delimit the scope of the study to a reasonable number of performance measures. Since it was difficult to incorporate many performance measures

---

in a single experimental study, it was decided that a representative variable would be selected for each of the two types of performance measurements. In accordance with accounting tradition, profitability was selected as the experimental end-result measure. The choice of a particular intermediate performance measure was unassisted by traditional practice. Since the list of intermediate variables available is extremely long, compliance was arbitrarily selected as the representative intermediate performance measure. In the following paragraphs, the selection of compliance will be explained.

Among the intermediate indicators, compliance was a particularly interesting indicator in that it is a fundamentally necessary condition for organizational functioning. In the organizational control system, a minimal level of compliance is necessary for mobilizing the organization's work force toward the attainment of organizational objectives. Consequently, it is probably the most fundamental behavior in the formal organization - the forerunner to productivity-oriented behaviors. One restriction on the notion of compliance, as being used here, is that the influence transaction\(^2\) within the structure of authority must be role relevant. In addition, the compliance must be voluntary. Blau and Scott\(^3\) suggest that voluntary compliance with legitimate commands is one criteria of

\(^2\) Katz and Kahn (The Social Psychology of Organizations, p. 218) describe an influence transaction as involving an interpersonal transaction in which one person acts in such a way as to change the behavior of another in some intended fashion.

\(^3\) Blau and Scott, Formal Organizations: A Comparative Approach.
authority. Voluntary compliance is also a key clause in the psychological contract between the organization and its members.\(^4\)

The members agree to the acceptance of authority in exchange for organizational rewards. The voluntary nature of the subordinate's acceptance of authority is important - a coercive situation in which a superior imposes his will over the resistance of the subordinate would not fall within the definition of compliance being utilized here. That is, in order for compliance to occur, the superior's influence attempt must be acceptable to the subordinate.

Barnard\(^5\) suggests that each organizational participant has a zone of indifference which is the crux of the authority relationship.\(^6\) Within the confines of the psychological contract, an organization can specify any of several modes of behavior - to which particular mode the individual would be indifferent. Thus within a certain range, the individual will accept directives without analyzing the merits of the behavior. However, if a directive does not fall within this range of acceptance, the influence attempt will be unsuccessful and the individual will fail to comply with the request. Examples of extreme cases of

---


6 Herbert A. Simon, Administrative Behavior (New York: The Macmillan Co., 1957) refers to it as a zone of acceptance.
the breakdown of the psychological contract and the acceptance of authority are mutinies, revolutions and worker strikes. However, in most cases the person in authority is supported by the power of punishment and reward, which usually enables him to extract at least a minimally acceptable level of compliance from his subordinates.

Over time, the zone of indifference may shift its boundaries. The psychological contract is molded through mutual influence and bargaining processes to establish a workable agreement. Therefore the contract in existence at any given moment depends on the power of the parties relative to each other. Perceived reductions in organizational reward or punishment situations may reduce the ability (power) of the organization to extract compliance from an organizational member. Compliance thus hinges upon the upholding of the psychological contract between the organization and its members.

Compliance, then, as defined here, is not directed toward the assumption that the results of operations will conform as closely as possible to organizational plans. Absolute conformity to plans is a different situation and invariable conformance to plans is not necessarily desired by, nor desirable for, the organization. To the extent that managers can make decisions that are superior to those implied in the plans, organizations would wish them to

7 See Anthony (Planning and Control Systems: A Framework for Analysis, pp. 28-30) for his comments on the conformance fallacy.
do so. Since no one can predict the future precisely, managers may be able to make better decisions than anticipated under certain circumstances. Actual events often diverge from those expected or predicted events that plans were designed to meet. In addition, even when plans are frequently revised, the time consumed in preparing and communicating the revisions will often result in the unavailability of revised plans on a timely basis. Furthermore, in some instances, plans may not indicate the best course of action available to the organization - subsequent to the plans' formulation, ways to improve upon them may be realized as alternatives become clearer. In any of these circumstances outlined above, strict managerial conformance to plans is not desirable to the organization and therefore not relevant as an indicator of managerial performance. What is relevant is compliance with organizational directives beneficial to organizational objectives. Compliance to directives beneficial to the organization's objectives is an important and significant aspect of performance and appears to be a readily measurable representative variable of intermediate performance indicators under experimental conditions. For these reasons, compliance was selected as the intermediate performance measure that would be investigated in the current experimental study.
II. Scope of the Experimental Study

In order to obtain a better understanding of some of the behavioral effects involved in the accounting task of providing information regarding performance outcomes, an experimental study was conducted to investigate the effects of select types of feedback and select levels of goal (or budget) difficulty upon the dependent measures of profitability and compliance. The inter-relationships of the variables investigated in the experimental study are outlined in Figure 5.

The goal-performance-reward model presented in Figure 2 outlined the general relationship between goals, performance or behavior, feedback, and various mediating factors. The variables depicted in Figure 5 are select, specific aspects of the more general variables presented in the goal-performance-reward (planning and control) model. Performance goal set (Box 1 in Figure 5) is analogous to Figure 2's performance budgets. Type of feedback - neutral or negative (Box 2 in Figure 5) is comparative to Figure 2's feedback information. Neutral feedback is represented by actual results feedback or profitability information in the experimental study while negative feedback is represented by exception feedback or negative variances reports. Self-esteem and achievement motivation (Box 4 in Figure 5) are instances of individual factors that affect individual goals (Box 4 in Figure 2) which appeared to be relevant in the current situation according to the review of the literature. Goal intentions (Box 5 in Figure 5) are
Figure 5. Variables investigated in the experimental study.
are indicative of Figure 2's individual goals represented on a pragmatic level. Profitability and compliance (Box 6 in Figure 5) are instances of Figure 2's behaviors and organizational consequences of behavior engaged in by the individual manager ($B_1$).

One variable in Figure 5, performance goal set, required further refinement to goal difficulty (Box 3 in Figure 5) insofar as various other aspects can be involved in goal setting such as participation and monetary incentives. In accordance with the relationships outlined in Figure 2, the effects of goal difficulty and type of feedback in Figure 5 are expected to be combined with task difficulty by the individual participant in formulating goal intentions. Performance intentions are expected to be affected by the individual's self-esteem and achievement motivation. Goal or performance intentions, once formulated by the individual, are then translated into action and measured by profitability and compliance in the experimental study.

The variable, goal intentions, requires further explanation. It has been theorized that individuals somehow combine past reward experiences and performance expectations (performance goal set) with their own individual goals to produce performance (or goal) intentions which are then translated into performance.8 There are some conjectures regarding the process whereby this occurs,

---

8 Locke, "The Relationship of Intentions to Level of Performance," Locke, Bryan and Kendall, "Goals and Intentions as Mediators of the Effects of Monetary Incentives on Behavior;" Feather, "Persistence at a Difficult Task with Alternative Task of Intermediate Difficulty."
notably in the expectancy theory literature. Expectancy theory hypothesizes a process whereby various factors are translated by individuals into performance. However, the expectancy model has not been tested satisfactorily in its entirety, although several studies have supported some sections of the model, and conjectures regarding the mechanics of the motivational process is beyond the range of the current investigation.

---

III. Description of the Basic Research Methodology

The Experimental Design

The literature suggests two main variables of major interest to the study - feedback and goal difficulty and their interactions. The research reviewed in the preceding chapters suggest an experimental type of approach insofar as it would permit the greatest control and manipulation of the variables of interest. In addition, this approach would be more directly related to the other research available. A 2 X 3 factorial experimental design, as shown in Figure 6, was the research methodology used in the study.

<table>
<thead>
<tr>
<th>Type of Feedback</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actual Results</td>
</tr>
<tr>
<td>High Goal</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Low Difficulty</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

Figure 6. The Experimental Groups of the Study

The design involved the manipulation of the two main variables of goal difficulty and type of feedback and the measurement of the two performance measures of profitability (P) and compliance (C).
The Independent Variables

1. Goal Difficulty. This variable consisted of budgeted profits which subjects were assigned and requested to achieve. There were two levels of budget difficulty utilized in the study:
   a) budgets difficult to attain (high goal difficulty), and
   b) moderate budgets which were somewhat less difficult to attain (low goal difficulty).10

The levels at which these two budgets were set were determined by past studies in goal difficulty, the specifics of which will be elaborated upon in the following paragraphs.

There appears to be an upper limit to the level of goal difficulty which budgeted individuals will accept. Hofstede11 hypothesized that up to a certain level of difficulty, goals of greater difficulty will be accepted, resulting in improved performance. Beyond this level of difficulty, the goal will be rejected and performance will decline. Unfortunately, little is known about the critical level at which budget goals may be rejected rather than accepted. Atkinson12 and Forward's studies13

---

10 Although these goals are moderate, they have been labeled here as low goals in order to facilitate comprehension.

11 Hofstede, The Game of Budget Control.


13 Forward, "Group Achievement Motivation and Individual Motives to Achieve Success and to Avoid Failure."
indicated that a maximum level of performance would be obtained when the probability of success was moderate (fifty per cent) and performance would be lower as the probabilities departed from fifty per cent in both directions. Stedry and Kay\textsuperscript{14} set moderate or normal goals as those achieved fifty per cent of the time in the past and difficult goals as those achieved twenty-five per cent of the time in the past. Stedry\textsuperscript{15} set low goals as having a 69 per cent probability of goal achievement, medium goals as having a 59 per cent probability of achievement and high goals as having a 39 per cent probability of achievement. Dunbar\textsuperscript{16} suggests that Stedry and Kay and Stedry's findings might be interpreted to indicate that positive feedback mechanisms should be designed to set goals such that they will not be attained more than 40 per cent of the time but probably not so difficult that they can be achieved only 25 per cent of the time.

Since there appears to be some support for the fifty per cent success level, the lower of the two budget levels in the current study was influenced by this figure. Given the nature of the experimental task, it was impossible to incorporate the fifty

\textsuperscript{14} Stedry and Kay, "The Effects of Goal Difficulty on Performance: A Field Experiment."


per cent probability of success level. The inexact interpretation of this level that was utilized in the experimental task was the possibility that goals could be attained in fifty per cent of the decision periods. That is, the lower budgets (the low goal difficulty condition) were set such that they could be attained in only five of the ten decision periods. However, in the other five periods when the lower budgets could not be attained, the budgets were set fairly close to the maximum achievable levels so that the discrepancies between the subjects' performance and their assigned performance levels were not too large.

Based on the Stedry and Stedry and Kay findings, the more difficult budgets (the high goal difficulty condition) were set such that they could be attained in only three of the ten decision periods. For these higher budgets, in the seven periods in which budget attainment was impossible, the discrepancies between the budget levels and the maximum achievable levels were set somewhat further apart than were the lower budgets. A pretest of the experimental task indicated that the difficult budgets were perceived as too high while the lower budgets were perceived as reasonable. An example of the budgets given to the experimental subjects is provided in Appendix A.

2. **Type of Accounting Feedback.** This variable was directed towards determining the effects, if any, of certain forms of accounting feedback. There were two experimental feedback conditions which were utilized in the study: actual results (neutral)
feedback and exception (negative) feedback. In addition, a no feedback condition was utilized to determine whether learning effects might be occurring in the subjects' performance of the experimental task. Actual results feedback consisted of a short performance report which informed the subjects of the profit and cost outcomes that resulted from their decisions. An example of this type of feedback is provided in Exhibit 3(A) in Appendix A. Exception feedback involved the transmission of cost and profit information only when unfavorable variances resulted between the subjects' performance and their assigned budgets or goals. An example of the exception feedback report form utilized in the study is provided in Exhibit 3(B) in Appendix A.\(^{17}\) Both types of performance reports included information regarding the units of sales achieved by the subject-managers' division in each decision period.

The control groups (the no feedback treatment groups), who were given performance reports in the first three decision periods,

\(^{17}\) Some studies, including that by Doris M. Cook ("The Effect of Frequency of Feedback on Attitudes and Performance," Empirical Research in Accounting: Selected Studies, 1967, Supplement to Volume 5, Journal of Accounting Research, Institute of Professional Accounting, Graduate School of Business, University of Chicago, 1968, pp. 213-224) indicate that the frequency of feedback may have some effect on performance. Although subjects who attained their budgets in the exception feedback condition did not always receive a performance report, they were informed that they would not receive a performance report if they attained their budget. Thus the fact that they did not receive a feedback message was, in itself, an implicit form of feedback and the frequency of feedback (explicit and implicit) would be equivalent in the two experimental conditions.
received reports identical in form to those received by the actual results feedback condition groups during these three periods. The control group subjects were given actual results type of feedback during the first three periods because it was expected from the pretest that the experimental task would be learned by the end of the third decision period. Beginning in the fourth period and through the tenth period, control subjects did not receive further feedback.

The no feedback condition was intended as a control to separate out any learning effects that might occur after the three periods projected as necessary for learning the experimental task. Since the interest of the study was in the motivational effects of feedback rather than in learning effects, the control condition was expected to be useful in separating learning effects from the motivational effects of feedback in the experimental conditions after decision period three.

The Dependent Variables

Performance outcomes observed in the study were two-fold, involving the end-result measure of profitability and the intermediate performance indicator of compliance.

1. Profitability. Profitability (P) was measured by (a) determining net profit resulting from decisions made by experimental subjects in each decision period, and (b) deriving a per cent profitability measure by dividing the net profit achieved by subjects in any one decision period by the maximum profit
possible in that period.

\[
P = \frac{\text{Profit achieved by a subject } t}{\text{Maximum profit possible } t}
\]

2. Compliance. Compliance \((C)\) is a measure of the acquiescence that subjects demonstrated toward the experimental compliance suggestion. The compliance suggestion consisted of a memorandum from the fictional company president suggesting that subject-managers produce more of the less profitable product Beta. (See Exhibit 4 in Appendix A.) This memorandum was handed to the subjects for their consideration in period seven with a verbal reminder in each of the following three periods that the memorandum suggestion was still in effect. The compliance measure was determined as follows:

\[
C = \frac{\text{Number of Beta units produced } t}{\text{Number of Alpha and Beta units produced } t}
\]

The Experimental Task

The experimental task involved a production-type decision problem set within the context of a business organization. There were several reasons why a production problem was selected as the experimental task. First, it is relevant to the type of decision that must be made in the business environment. Second, the task enables an investigation of the effects of the experimental treatment upon profitability and compliance. Third, the procedure lends itself
to the incorporation of the experimental variables of different types of accounting feedback and different levels of goal or budget difficulty. Fourth, the task was straightforward enough so as to become somewhat tedious once subjects had learned how to approach the problem. In addition, the task could be fashioned such that it involved only simple computations, minimizing the effect that subject intelligence differences might have on the experimental results. Finally, the task appeared to be meaningful in relation to the accounting literature reviewed.

In developing the experimental task, every effort was made to make the data look as realistic as possible to the subjects. In order to eliminate the effects of interdependence between decisions of different periods, the task was simplified to exclude the carry-over of inventories of raw materials and finished goods.

Subjects were requested to make decisions over ten periods and were informed that their goal was to meet or exceed the budget assigned to their division which they received at the beginning of each period. In each decision period, subjects could purchase up to 150 units of raw materials A and B to use in the production of finished products Alphas and/or Betas. The purchase costs of raw materials A and B and the selling prices of Alphas and Betas, which were determined randomly and changed from period to period, were provided to subjects along with the budgets in each period. The amount of raw materials available for purchase was constant in all ten decision periods. Subjects were informed that sales in any one period varied between 20 and 30 units for Alphas and between
15 and 25 units for Betas. The sales levels of Alphas and Betas in each decision period were determined by adding a factor from a random table to a minimum level of sales established for Alphas and Betas. Subjects had unlimited production capacity and could produce as much or as little as they desired. However, the division to which subjects were assigned had certain fixed manufacturing and selling costs which would discourage subjects from making decisions not to produce in any one period. The constraints of the problem assigned to the experimental subjects can be found in Exhibit 1 of Appendix A.

The Experimental Subjects

The question of what subjects should be used in the study was determined by the homogeneity of the subject group, their availability and their cost. In addition, the experimental subjects were determined by the relation of the subject group to the task. The problem involved in the experimental task required some familiarity with budgets and income statements and with solving production problems using the contribution margin approach. For all of the preceding reasons, accounting students were selected as the subject group for the study. They were available, constituted a relatively homogeneous population and could be obtained fairly inexpensively. As accounting students, they were acquainted with the concepts of budgets, contribution margins and income statements.

18 In fact, none of the subjects in the study chose the decision of no production in any of the decision periods.
Before beginning the experimental session, subjects were screened to determine their ability to solve the problem used in the study and were given a brief review of contribution margin computations. At the beginning of the experimental session, the subject was randomly assigned to one of the six experimental conditions described in Figure 6. Since the analysis of experimental results is facilitated by an equal number of subjects in each experimental condition or cell, especially when there are violations of the normality assumption, an equal number of subjects were obtained for each cell.

The exact number of subjects required for each experimental cell has not been strictly resolved in the literature on experimental design. One solution to the problem of subject size, the selection of sample size to optimize the power of the test, was not a practical approach since previous results for this type of study were not available. Discussions with a faculty member in the Department of Psychology indicated that a general guideline for the minimum number of subjects that should be used was five subjects per cell. Review of subject availability indicated that thirty-six subjects were about the maximum that could be obtained given the time of year. This resulted in six subjects per cell.

Subjects were recruited from various accounting classes and the accounting honorary at the university. Subjects were informed that the experiment involved approximately a two-hour session for which a payment of five dollars would be provided. A sign-up sheet
was provided so that subjects could select a session data and time that was convenient.

**Experimental Procedures**

Before the experimental session began, subjects were screened to determine their ability to solve the problem involved in the study. Potential subjects were given the problem utilized in the experiment and a budget for the first decision period. Four potential subjects were turned away at this stage because they were either unable to solve the problem or indicated that they felt the problem was too difficult for them. All the subjects who remained in the experiment indicated that they were basically familiar with contribution margin computations. Nevertheless, each subject received a brief review of contribution margin computations, utilizing the data in the experimental problem.

When subjects appeared to understand the computational requirements of the experimental task, they were given a brief questionnaire to complete (Exhibits 7 and 8 in Appendix A). The questionnaire was intended to determine if achievement motivation and self-esteem needs might have some influence on the performance of subjects. The self-esteem section of the questionnaire was developed by De Charms and Rosenbaum\(^{19}\) and had been utilized in a number of psychological studies.\(^{20}\) The achievement motivation


\(^{20}\) One such study was that by Day and Hamblin, "Some Effects
section of the questionnaire, developed by Hermans,\textsuperscript{21} was utilized since the interpretation of the projective tests customary for measuring achievement motivation (such as the Thematic Apperception Test or TAT) was considered to be beyond the range of the experimenter.

After subjects had completed the questionnaire they were advised to proceed to the experimental problem, making decisions over ten periods as managers of a division in a manufacturing organization. They were informed that their objective was to attempt to meet their assigned profit budgets in each decision period, exceeding it where possible. The major constraints of the problem were reiterated and remaining subject difficulties, if any, with the experimental problem were resolved. Subjects were then handed decision forms for each of the ten decision periods (Exhibit 5 in Appendix A), one form to be submitted each time a decision was made. Subjects were also advised of the time constraints on their decisions. Time constraints were necessary in order to ensure that the experimental session would not exceed two hours. After the first few periods, time constraint warnings were unnecessary except in a few cases. Subjects who required time reminders were asked to make their decisions shortly, but were allowed to proceed at their own pace rather than being forced to

make their decisions immediately. When subjects completed a decision, they submitted that decision to the experimenter and promptly received performance reports regarding their decision from a computer terminal in accordance with their experimental condition. At the same time, the computer also provided the budget and cost and price information for the following period.

At the beginning of the seventh decision period, subjects were given a suggestion from the fictional president of their company to produce more of the less profitable product (the compliance suggestion). This suggestion was intended to put subjects in a conflict situation between profitability and compliance in order to determine the effects of the experimental conditions. A conflict situation was considered necessary insofar as a straightforward compliance situation was expected to result in high compliance by the subjects who have nothing to lose by complying and no reason not to do so given their voluntary agreement to participate in the study.

After the tenth decision period, subjects were asked to complete a post-experimental questionnaire (Exhibit 6 in Appendix A). The questionnaire examined the subjects' perceptions of the budgets and their performance as well as descriptions of the methods employed in solving the experimental problem. At the end of the experimental session, the study was explained to the subjects and any remaining questions regarding specific aspects of the experimental study were answered.
After 36 subjects had been run in the experiment, it became necessary to replace one subject in one of the control groups. This subject had maintained an unchanging and extremely poor decision throughout the ten decision periods. A replacement was found for this subject at the end of the experimental process. Since the subject was in one of the control groups, the effects of his replacement upon the experimental results was expected to be minimal.
IV. The Research Hypotheses

The four research hypotheses were formulated on the basis of a two-way analysis of variance. Some outcomes regarding the hypothesized variables that might be anticipated from the literature review are discussed briefly.

1. Feedback and profitability

$H_0$: Significant differences will not exist among the three feedback treatment groups with regard to profitability.

The rationale for testing the first hypothesis was based on the evidence in the literature review which suggested that negative forms of reinforcement are associated with lower performance levels. Although exception reporting, in theory, is not confined to negative reporting, it is negatively-oriented in practice. Consequently, the performance levels of the groups receiving the exception feedback treatment were anticipated to be lower than the groups receiving neutral, actual results feedback. Under certain conditions, negative forms of reinforcement have been associated with higher performance levels. However, these situations have involved the administration of noxious stimuli, such as electric shocks, and the resultant higher performance levels either involved short-run experimental situations or were of short-run duration.

2. Feedback and compliance

$H_0$: Significant differences will not exist among the three feedback treatment groups with regard to compliance.
The rationale for testing this second hypothesis was the belief that subjects receiving negatively-oriented feedback might be less cooperative to organizational objectives than subjects receiving neutral feedback. The literature review suggested that subjects receiving negatively-oriented feedback might react negatively to such implied criticisms of their performance. However, studies on compensatory behavior indicate that some subjects could attempt to compensate for their profit goal "failures" by carefully following orders or suggestions.

3. Goal difficulty and profitability

\[ H_0: \] Significant differences will not exist between the higher and lower budget difficulty groups with regard to profitability.

The rationale for testing this hypothesis was the belief that subjects assigned higher budgets would demonstrate lower profits than subjects assigned lower budgets. However, this outcome was dependent on subject perception of the higher budget - that they were impossible to attain. Preliminary tests of the experimental budget levels indicated that the higher budgets were perceived to be "too high" and the lower budgets to be moderate. Unfortunately, guidelines from past studies were not available for the type of task employed in the current study. If the higher budgets in the experiment were perceived as challenging rather than impossible, then subjects assigned these
budgets should produce higher profits than subjects assigned lower budgets. This latter outcome is suggested by studies in the literature review which found higher goals to be associated with better performance up to some critical level of goal difficulty; goals beyond this critical level were found to result in performance declines.

4. Goal difficulty and compliance

\[ H_0: \text{Significant differences will not exist between the higher and lower budget difficulty groups with regard to compliance.} \]

The anticipated outcomes underlying this hypothesis are also predicated on subject perceptions regarding the higher budgets. The anticipated outcomes are the same as those specified for goal difficulty and profitability.
CHAPTER FOUR

ANALYSIS OF RESULTS

In order to evaluate the validity of the experimental hypotheses, an analysis of variance procedure was applied to the experimental data. The data were grouped in accordance with the 2 x 3 experimental design with six observations (for six subjects) per cell. The statistical model underlying the two-way analysis of variance procedure is given by the following:

\[ Y_{ijk} = \mu + \alpha_i + \beta_j + \alpha\beta_{ij} + e_{ijk} \]  \hspace{1cm} (1)

where \( Y_{ijk} \) is the observed datum, \( \alpha_i \) represents the effect of goal difficulty (or budget level), \( \beta_j \) represents the effect of type of feedback, \( \alpha\beta_{ij} \) represents the effect of the interaction between budget level and type of feedback, and \( e_{ijk} \) represents the error term. The observed datum \( Y_{ijk} \) was obtained as follows:

\[ Y_{ijk} = \frac{6}{k=1} \overline{P}_{ijk} \]  \hspace{1cm} for profitability and \hspace{1cm} (2)

\[ Y_{ijk} = \frac{6}{k=1} \overline{C}_{ijk} \]  \hspace{1cm} for compliance. \hspace{1cm} (3)

\( \overline{P}_{ijk} \) was obtained in the following manner:

\[ \overline{P}_{ijk} = \frac{2}{7} \sum_{t=7}^{P_{ijk}} \]  \hspace{1cm} (4)

96
and

\[ \hat{P}_{ijk} = \frac{P_{ijk}}{\text{Maximum profit } t} \]  \hspace{1cm} (5)

where \( P_{ijk} \) is the net income achieved in decision period \( t \) by subject \( k \) who is receiving budget level \( i \) and feedback type \( j \). \( C_{ijk} \) was obtained in the following way:

\[ \bar{C}_{ijk} = \frac{2}{t-7} C_{ijk} \]  \hspace{1cm} (6)

and

\[ C_{ijk} = \frac{\text{Betas}_{ijk}}{(\text{Alphas} + \text{Betas})_t} \]  \hspace{1cm} (7)

The null hypotheses appropriate to this procedure, expressed in terms of the parameters of the statistical model are:

- \( H_1: \alpha_i = 0 \) for all \( i \), implying that responses do not vary across budget level treatments.
- \( H_2: \beta_j = 0 \) for all \( j \), implying that responses do not vary across type of feedback treatments.
- \( H_3: \alpha \beta_{ij} = 0 \) for all \( i \) and all \( j \), implying that the effect of one experimental variable is independent of the effect of the other experimental variable.

Corresponding to each of these null hypotheses is the alternative that responses do vary for different treatments.

Profitability (\( \hat{P}_{ijk} \)) and compliance (\( \bar{C}_{ijk} \)) scores for each subject \( k \) indicate the average degree of profitability or compliance that each subject demonstrated in his or her performance of the experimental task over the relevant time periods. Profitability scores were available for ten decision periods. These scores may be found in Appendix E. Learning was expected to take approximately
three periods based on pre-tests, but a period by period examination of the experimental data indicated considerable variability in the profitability scores through decision period six. The variability of the scores indicated either (1) that learning of the experimental task took six periods rather than the anticipated three, or (2) that the learning of the experimental task took up to three periods depending on the individual subject but that boredom set in shortly after the problem was mastered due to the repetitive nature of the task. If learning accounted for the variability of the scores, individual learning sessions which enable mastery of the task by the subject before the imposition of experimental treatment conditions would have improved control over performance variability. If boredom accounted for score variability, a larger number of subjects in each experimental treatment group should largely have removed individual differences and, consequently, have reduced the variability of the scores. In either case, the high variability of the profitability scores between decision periods one and six rendered the analysis of those scores to be futile. However, the profitability scores decreased in variability in period seven, at the time when the compliance suggestion was introduced into the study, and continued to be less variable through period nine. This finding supported the theory that boredom may have been responsible for the variability in the scores through period six. The introduction of a new consideration in the decision-making process in period seven may
have renewed interest in the experimental task. In period ten, the profitability scores, once again, became variable—probably reflecting last period effects. Due to the variability of the scores in the other periods, only the profitability scores in decision periods seven through nine were utilized in the data analysis.

Compliance scores were available for four decision periods, seven through ten. These scores are provided in Appendix E. As in the profitability scores, last period effects appeared to be present in the compliance scores in period ten. Consequently, only the data for decision periods seven through nine were utilized for compliance data analysis.

The data obtained in periods seven through nine indicated that the highest profits were achieved by subjects receiving low budgets and no feedback (after period three). This group of subjects was followed closely by subjects receiving high budgets and actual results feedback (see Figure 7). Apparently, challenging goals and non-critical feedback were most conducive to high profit performance among the experimental groups. The third highest profits were achieved by subjects receiving low budgets and exception feedback. When the budgets were moderate, subjects were responding fairly well, with regard to profit, to a critical feedback approach. Subjects receiving high budgets and no feedback achieved the fourth highest profits, followed by subjects receiving high budgets and exception feedback. With both difficult budgets
Figure 7: Observed relationship between profitability and type of feedback at the two experimental budget levels.
and critical feedback, performance appeared to deteriorate among the experimental subjects. Finally, the lowest profits were associated with those subjects receiving low budgets and actual results feedback. These subjects, free of difficult budgets or critical feedback, apparently felt little pressure to achieve high profits - the objective or goal assigned to all experimental subjects.

Averaged compliance scores from periods seven through nine indicated that subjects showing the highest compliance to the suggestion from the fictional company president (which would result in lower profits) were those receiving low budgets and actual results feedback (see Figure 8). It is surmised that subjects in this group felt they could afford to go along with the president's suggestion since their budget goals were not too difficult and the feedback they were receiving was not critical of their performance. This group was the least threatened of the experimental groups. The low budget, neutral feedback group was followed in degree of compliance by the group receiving high budgets and exception feedback. The subjects in this group may have complied with the president's suggestion in order to do something right - they were not achieving their budget goals and were being informed that they were not succeeding in reaching those goals; by complying, they were succeeding on one criterion of task performance. The group of subjects showing the next highest compliance were those receiving high budgets and actual
 Compliance
(Periods 7-9 averaged for each of the six subjects in each cell)

<table>
<thead>
<tr>
<th></th>
<th>Actual Results</th>
<th>Exception</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Type of Feedback

Figure 8: Observed relationship between compliance and type of feedback at the two experimental budget levels.
results type of feedback followed by the two control groups who were not receiving feedback after period three. These three groups may have been concentrating on their profit goals since two of the three groups achieved the two highest profits and the other group had the fourth highest profits. The lowest compliance occurred in the group receiving low budgets and exception feedback. These subjects, informed of their failures to meet their budget goals, may have either been concentrating on reaching their profit goals and/or displaying some defiance towards their critical authorities.

Analysis of variance procedures require that the data satisfy the assumptions of normality and homogeneity of variance. The \(F\) test upon which analysis of variance procedures rely is robust with respect to departures from normality provided the sample size is uniform across treatments. Nevertheless, these two assumptions were investigated for the current data.

To determine if the data had any serious violations of the homogeneity of variance assumption, the \(F_{\text{max}}\) statistic proposed by Hartley\(^1\) was applied to the cell variances although tests of homogeneity are extremely sensitive to departures from normality assumptions.\(^2\) The compliance scores did not violate the homogeneity assumptions.

---


of variance assumption but violations were observed for the profitability scores. To counteract the violation in homogeneity, a monotonic transformation was applied to the data. The arcsine transformation\(^3\) improved homogeneity of the profitability scores such that the data satisfied the homogeneity of variance assumption.\(^4\) Full details of the homogeneity tests are provided in Appendix B.

In order to investigate normality of the experimental data, the third and fourth moments about the mean were computed for the cell scores. The third moment about the mean did not indicate skewness for either profitability or compliance data in the experimental treatment groups in decision periods seven through nine, and the standardized fourth moment did not indicate high tails for profitability or compliance data. Full details of these computations are provided in Appendix B.

The Kolmogorov-Smirnov goodness-of-fit tests for normal distributions were computed for each experimental treatment group to provide an additional test for possible non-normality.\(^5\) These


\(^4\) There is some evidence in the literature that tests for homogeneity of variance has rather limited practical utility and that "analysis of variance can and should be carried on without a preliminary test of variances, especially in situations where the number of cases in the various samples can be made equal." (From Hayes, Statistics for the Social Sciences, p. 494).

tests indicated that non-normality was rejected for four of the six cells in both profitability and compliance data. The arcsine transformed profitability data had normality rejected in one of the two possible non-normal cells at .15 level of significance and in the other at .10. The Kolmogorov-Smirnov tests indicated that the compliance data also had two cells violating normality—one at .10 level of significance and the other at .01 level of significance. The latter cell represented the most gross violation of normality in either profitability or compliance data. Further details of the results of the Kolmogorov-Smirnov tests can be found in Appendix B.

In an attempt to improve normality in the compliance data, the arcsine transformation was investigated for the compliance scores. As the computations in Appendix B demonstrate, the arcsine transformation did not improve normality in the compliance scores. Since transformations did not improve normality, the regular compliance scores were utilized in further data analysis of compliance. However, since the arcsine transformation did improve homogeneity of variance in the profitability data, the arcsine transformed profitability scores were used in further analyses of profitability. The non-normality in some of the experimental treatment cells indicates that any conclusions drawn from the analysis of variance procedures must be qualified.

Analysis of variance tables for profitability and compliance in periods seven through nine are provided in Tables 3, 4 and 5. Cell means and marginal means for the data analyzed are also provided
### TABLE 3

**ANALYSIS OF VARIANCE - PROFITABILITY (periods 7-9)**

<table>
<thead>
<tr>
<th>Cell Means and Marginal Means</th>
<th>Cell Means</th>
<th>Marginal Means</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\beta_1$</td>
<td>$\beta_2$</td>
</tr>
<tr>
<td>$\alpha_1$</td>
<td>.9344</td>
<td>.8559</td>
</tr>
<tr>
<td>$\alpha_2$</td>
<td>.7916</td>
<td>.8952</td>
</tr>
<tr>
<td>Marginal Means</td>
<td>.8630</td>
<td>.8755</td>
</tr>
<tr>
<td>$\mu_1$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\mu_2$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\mu_3$</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Analysis of Variance Table

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>35</td>
<td>.2988</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\alpha$</td>
<td>1</td>
<td>.0015</td>
<td>.0015</td>
<td>.1461</td>
</tr>
<tr>
<td>$\beta$</td>
<td>2</td>
<td>.0121</td>
<td>.0061</td>
<td>.5891</td>
</tr>
<tr>
<td>$\alpha \beta$</td>
<td>2</td>
<td>.0771</td>
<td>.0386</td>
<td>3.7536*</td>
</tr>
<tr>
<td>$S/\alpha \beta$</td>
<td>30</td>
<td>.3081</td>
<td>.0103</td>
<td></td>
</tr>
</tbody>
</table>

* Significant at .05  
($F(.05,2,30) = 3.32$)
### Table 4

**Analysis of Variance - Arcsine Transformed Profitability Scores**  
(Periods 7-9)

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>35</td>
<td>3.5910</td>
<td></td>
<td></td>
</tr>
<tr>
<td>α</td>
<td>1</td>
<td>0.0017</td>
<td>0.0017</td>
<td>0.0186</td>
</tr>
<tr>
<td>β</td>
<td>2</td>
<td>0.1397</td>
<td>0.0699</td>
<td>0.7629</td>
</tr>
<tr>
<td>αβ</td>
<td>2</td>
<td>0.7029</td>
<td>0.3515</td>
<td>3.8386 *</td>
</tr>
<tr>
<td>S/αβ</td>
<td>30</td>
<td>2.7467</td>
<td>0.0916</td>
<td></td>
</tr>
</tbody>
</table>

* Significant at .05
TABLE 5

ANALYSIS OF VARIANCE - COMPLIANCE (Periods 7-9)

<table>
<thead>
<tr>
<th></th>
<th>( \beta_1 )</th>
<th>( \beta_2 )</th>
<th>( \beta_3 )</th>
<th>Marginal Means</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \alpha_1 )</td>
<td>.4081</td>
<td>.4765</td>
<td>.4066</td>
<td>( \mu_1 )</td>
</tr>
<tr>
<td>( \alpha_2 )</td>
<td>.5040</td>
<td>.3736</td>
<td>.3836</td>
<td>( \mu_2 )</td>
</tr>
<tr>
<td>Marginal Means</td>
<td>( \mu_1 )</td>
<td>( \mu_2 )</td>
<td>( \mu_3 )</td>
<td>( \mu )</td>
</tr>
</tbody>
</table>

Analysis of Variance Table

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>25</td>
<td>( .4045 )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>( \alpha )</td>
<td>1</td>
<td>( .0009 )</td>
<td>( .0009 )</td>
<td>( .0840 )</td>
</tr>
<tr>
<td>( \beta )</td>
<td>2</td>
<td>( .0223 )</td>
<td>( .0112 )</td>
<td>( 1.0411 )</td>
</tr>
<tr>
<td>( \alpha \beta )</td>
<td>2</td>
<td>( .0823 )</td>
<td>( .0412 )</td>
<td></td>
</tr>
<tr>
<td>S/( \alpha \beta )</td>
<td>30</td>
<td>( .3213 )</td>
<td>( .0107 )</td>
<td></td>
</tr>
</tbody>
</table>

* Significant at .05
in the tables. Table 3 summarizes the data for unadjusted profitability scores, Table 4 the data for arcsine transformed profitability scores and Table 5 the unadjusted compliance scores. In addition, analysis of variance was performed on the scores for each period, seven through nine, for both profitability and compliance. These results, provided in Appendix C, indicate no significant effects for any one of these periods taken individually. As a consequence, further analyses focused on the overall effects of periods seven through nine.

The results of the two-way analysis of variance for the period seven through nine data indicated no significance for the main effects of different budget levels and different types of feedback for either profitability or compliance data. However, they did indicate significant interaction for both profitability and compliance, using a .05 level of significance cut-off point.

When two independent variables are found to interact, this is a cue that additional insight concerning the results might be obtained by computing tests of simple main effects. These tests are intended to evaluate the following five null hypotheses.

1. $H_0: \alpha_i = 0$ for all $i$ at level $\beta_1$
2. $H_0: \alpha_i = 0$ for all $i$ at level $\beta_2$
3. $H_0: \alpha_i = 0$ for all $i$ at level $\beta_3$
4. $H_0: \beta_j = 0$ for all $j$ at level $\alpha_1$

---

(5) \( H_0: \beta_j = 0 \) for all \( j \) at level \( \alpha_2 \)

In determining significance, the recommended procedure is to assign the same per family error rate to simple main effects tests as that allotted for the overall F ratio. This procedure divides the overall level of significance for a main effects test evenly among the collection of simple main effects tests. It follows that each of the simple main effects ratios should be tested at \(.025 (0.05/2)\) for \( \alpha \) (budget level effects) and at \(.0133 (0.05/3)\) for \( \beta \) (type of feedback effects). However, Kirk indicates that an examination of contemporary research practices as described in the scientific literature clearly shows that many experimenters prefer to adopt the individual simple main-effects hypothesis as the conceptual unit for the error rate.\(^7\) If this procedure is followed, the critical values for tests involving treatments \( \alpha \) and \( \beta \) would utilize a significance level of \(.05\) for each treatment. A table of the simple main effects for profitability and compliance scores are provided in Table 6.

The test for simple main effects indicate that for profitability scores, different budget levels were significant at \(.0167\) with actual results feedback. Different budget levels were somewhat less significant with no feedback at \(.20\) level of significance. In addition, the type of feedback was significant for profitability scores at \(.05\) at the lower budget level. For compliance, different budget levels were significant for exception feedback at \(.10\) level of significance.

\(^7\) Ibid., p. 181.
### TABLE 6

**TABLE OF SIMPLE MAIN EFFECTS - PROFITABILITY**  
(Arcsine transformed scores, Periods 7-9)

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\alpha$ at $\beta_1$</td>
<td>1</td>
<td>.4243</td>
<td>.4243</td>
<td>4.6343***</td>
</tr>
<tr>
<td>$\alpha$ at $\beta_2$</td>
<td>1</td>
<td>.0674</td>
<td>.0674</td>
<td>.7362</td>
</tr>
<tr>
<td>$\alpha$ at $\beta_3$</td>
<td>1</td>
<td>.2129</td>
<td>.2129</td>
<td>2.3253*</td>
</tr>
<tr>
<td>$\beta$ at $\alpha_1$</td>
<td>2</td>
<td>.1872</td>
<td>.0936</td>
<td>1.0223</td>
</tr>
<tr>
<td>$\beta$ at $\alpha_2$</td>
<td>2</td>
<td>.6554</td>
<td>.3277</td>
<td>3.5792***</td>
</tr>
<tr>
<td>$S/\alpha\beta$</td>
<td>30</td>
<td>2.7467</td>
<td>.0916</td>
<td></td>
</tr>
</tbody>
</table>

### TABLE OF SIMPLE MAIN EFFECTS - COMPLIANCE (Periods 7-9)

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\alpha$ at $\beta_1$</td>
<td>1</td>
<td>.0276</td>
<td>.0276</td>
<td>2.5733*</td>
</tr>
<tr>
<td>$\alpha$ at $\beta_2$</td>
<td>1</td>
<td>.0317</td>
<td>.0317</td>
<td>2.9527**</td>
</tr>
<tr>
<td>$\alpha$ at $\beta_3$</td>
<td>1</td>
<td>.0016</td>
<td>.0016</td>
<td>.1485</td>
</tr>
<tr>
<td>$\beta$ at $\alpha_1$</td>
<td>2</td>
<td>.0191</td>
<td>.0096</td>
<td>.8926</td>
</tr>
<tr>
<td>$\beta$ at $\alpha_2$</td>
<td>2</td>
<td>.0632</td>
<td>.0316</td>
<td>2.9496**</td>
</tr>
<tr>
<td>$S/\alpha\beta$</td>
<td>30</td>
<td>.3213</td>
<td>.0107</td>
<td></td>
</tr>
</tbody>
</table>

**** Significant at .0167  
*** Significant at .05  
** Significant at .10  
* Significant at .20
and for actual results feedback at .20. Also, with regard to lower budgets, different types of feedback were significant for the compliance scores at .10 level of significance.

The F tests indicated that some interactions occurred, but do not indicate the directions of the effects. The comparisons of interest in the current study are those involving interactions between the independent experimental variables – namely, between actual results feedback and exception feedback at the two budget levels. The control (no feedback) groups were intended to ascertain any learning effects that might be present beyond period three, an intention that could not be tested due to the high variability in the profitability scores. Beyond ascertaining learning effects, the control groups were of no further interest. Thus the multiple comparisons investigated in the following section will consider only the experimental feedback conditions and will not include the two control groups.

The pair-wise comparisons of interest to the current study involve the following four hypotheses:

1. $H_0: \mu_1 = u_2$
2. $H_0: \mu_3 = u_4$
3. $H_0: \mu_1 = u_3$
4. $H_0: \mu_2 = u_4$

where $\mu_1$ refers to the mean of the group receiving high budgets and actual results feedback, $\mu_2$ the mean of the group receiving high budgets and exception feedback, $\mu_3$ the mean of the group receiving low budgets and actual results feedback and $\mu_4$ the mean of the group
receiving low budgets and exception feedback.

In order to investigate the interactions and pairwise comparisons of the four hypotheses, Tukey's multiple comparison method\(^8\) was employed. Tukey's test enables the experiment-wise error rate to be held at \(\alpha\) for the entire set of contrasts, and is considered the most powerful multiple comparison technique for pairwise comparisons.\(^9\) Tukey's procedure is based on the distribution of \(q\), the studentized range defined as the range of group means being compared divided by an estimate of the standard deviation of the values. The results of the Tukey test are provided in Table 7.

The results of Tukey's procedure indicates that for profitability data, significant differences occurred between the different feedback conditions at the low budget level and between different budget levels in the actual results feedback condition. For compliance scores, significant differences occurred between the different feedback conditions at the low budget level and between different budget levels in both actual results and exception feedback conditions. In addition, the difference between the experimental feedback conditions at the high budget level appears to be significant at \(\alpha = .10\) for both profitability and compliance scores although tables were not available for this level of significance.


\(^9\) Ibid., p. 365.
TABLE 7
TUKEY'S MULTIPLE COMPARISON TEST

Profitability Scores

<table>
<thead>
<tr>
<th>$H_0$</th>
<th>$q_{observed}^a$</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) $\mu_1 - \mu_2 = 0$</td>
<td>3.8325</td>
</tr>
<tr>
<td>(2) $\mu_3 - \mu_4 = 0$</td>
<td>4.5550 *</td>
</tr>
<tr>
<td>(3) $\mu_1 - \mu_3 = 0$</td>
<td>5.9968 *</td>
</tr>
<tr>
<td>(4) $\mu_2 - \mu_4 = 0$</td>
<td>2.3907</td>
</tr>
</tbody>
</table>

Compliance Scores

<table>
<thead>
<tr>
<th>$H_0$</th>
<th>$q_{observed}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) $\mu_1 - \mu_2 = 0$</td>
<td>3.7582</td>
</tr>
<tr>
<td>(2) $\mu_3 - \mu_4 = 0$</td>
<td>7.1648 *</td>
</tr>
<tr>
<td>(3) $\mu_1 - \mu_3 = 0$</td>
<td>5.2692 *</td>
</tr>
<tr>
<td>(4) $\mu_2 - \mu_4 = 0$</td>
<td>5.6538 *</td>
</tr>
</tbody>
</table>

* Significant at .05 with $q_{critical} = q_{.05, 20} = 3.96$

*a* $q_{observed} = q(r) = \frac{\text{Range of means}}{\text{Standard deviation}}$

where *r* = degrees of freedom
Since normality was violated in some of the experimental cells, a second test of the four hypotheses on page 112 was conducted using Scheffé's multiple comparison method.\(^{10}\) The Scheffé procedure is less sensitive to violations of normality and homogeneity of variance assumptions than is the Tukey test.\(^{11}\) It therefore serves as a check of the results of the Tukey test in the current study where some violations of normality have occurred. The Scheffé test evaluates the $F$ statistic against the criterion $F$ that is required for significance at the $\alpha$ level on $a-1$ and $a(n-1)$ degrees of freedom where $\alpha$ is the experiment-wise error rate. The experiment-wise error rate is controlled for the set of all possible contrasts. Scheffé recommended that the experiment-wise error rate be set at ten per cent$^{12}$ to account for the reduced power of the test to detect significance. The results of the Scheffé test are provided in Table 8.

In general, the results of the Scheffé test corroborate the results from Tukey's procedure. For profitability scores, the Scheffé test indicated that the two budget levels are significantly different with actual results feedback, while the differences between the feedback conditions at both high and low budget levels are slightly significant. In the compliance scores, the experimental feedback conditions at the low budget level are significantly

\(^{10}\) Ibid., pp. 363-364.
\(^{11}\) Ibid., pp. 364-365.
\(^{12}\) Ibid., p. 364.
TABLE 8

Scheffé's Multiple Comparison Test

<table>
<thead>
<tr>
<th>Ho</th>
<th>F_{observed}</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) \mu_1 - \mu_2 = 0</td>
<td>1.8335 *</td>
</tr>
<tr>
<td>(2) \mu_3 - \mu_4 = 0</td>
<td>2.5916 *</td>
</tr>
<tr>
<td>(3) \mu_1 - \mu_3 = 0</td>
<td>4.4913 ***</td>
</tr>
<tr>
<td>(4) \mu_2 - \mu_4 = 0</td>
<td>.7134</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ho</th>
<th>F_{observed}</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) \mu_1 - \mu_2 = 0</td>
<td>1.7519</td>
</tr>
<tr>
<td>(2) \mu_3 - \mu_4 = 0</td>
<td>6.3717 ***</td>
</tr>
<tr>
<td>(3) \mu_1 - \mu_3 = 0</td>
<td>3.4448 **</td>
</tr>
<tr>
<td>(4) \mu_2 - \mu_4 = 0</td>
<td>3.9667 **</td>
</tr>
</tbody>
</table>

*** Significant at .05 with \( F_{critical} = F_{.05,1,20} = 4.35 \)

** Significant at .10 with \( F_{critical} = F_{.10,1,20} = 2.97 \)

* Significant at .20 with \( F_{critical} = F_{.20,1,20} = 1.76 \)

\[ F_{observed} = \frac{[c_{jk}(\sum_{i=1}^{n} x_{ijk}) - c_{jk}(\sum_{i=1}^{n} x_{ijk})]^2}{n MS_{error} \sum_{jk} c_j^2} \]
different while the differences between the budget levels for both actual results feedback and exception feedback are significant at .10 level of significance. Thus, although the level of significance varies in the two tests, the results of the Tukey and Scheffé procedures are generally comparable for both profitability and compliance scores.

Based on past research, achievement motivation and the need for self-esteem were expected to affect task performance to some extent during the experiment. With that possibility in mind, questionnaires that measured achievement motivation and the need for self-esteem were administered to experimental subjects. Achievement motivation was expected to be related to profitability performance and the need for self-esteem to the degree of compliance exhibited by subjects to the compliance suggestion. A rank correlation of achievement motivation scores and profitability and of the need for self-esteem and compliance, using the Kendall Tau coefficient, indicated no significant relationships between these pairs of variables in the experimental results. The details of this correlation, as well as the results of the post-experimental questionnaire, are provided in Appendix C.

There are a number of reasons why the correlations between achievement motivation and profitability and between the need for self-esteem and compliance were not significant. The most probable explanation is that the experimental task failed to exploit either individual achievement motivation or need for self-esteem to increase
performance. A second explanation is that cell sizes, of six subjects per cell, are too small to detect such relationships even if they are present. Another possible explanation is that the instruments of measurement for achievement motivation and the need for self-esteem which were utilized in the study were suspect. Projective tests are usually preferred for measuring motivational characteristics, particularly achievement motivation. The relatively brief questionnaires utilized in the study may not have been sufficiently sensitive to measure achievement motivation or the need for self esteem.

This concluding section of the chapter considers the extent to which the experimental data supported the four hypotheses specified in Section IV of Chapter Three. Although the experimental data indicated that none of the four hypotheses could be rejected, this result was due largely to interaction effects between the two independent variables, goal difficulty and type of feedback. The interactions were disordinal - the result of which was experimental effects at one level of an independent variable cancelled effects in the opposite direction at another level of the same independent variable. For example, when the effects of high and low budgets were summed to determine the effects of the two types of feedback, the conclusion was that different types of feedback have no effect on performance although at each budget level (high or low), different feedback types did have different results in performance. Disordinal interactions obliterate the effects of one independent variable if
the other independent variable's effects are not taken into account. The interactions in the experimental study were statistically significant although the specific level of significance varied with the statistical procedure employed.

Due to the presence of disordinal interactions, the data as a whole did not provide support for the expected outcomes that had underlied the four experimental hypotheses. If one budget level or one feedback type was isolated, data could be cited to support a particular expected outcome. However, data at a different budget level or different feedback type could be cited to reject that same expected outcome. The following paragraphs will consider the experimental outcomes as they relate specifically to each of the four experimental hypotheses.

The first experimental hypothesis concerned the effects of different types of feedback on profitability. Analysis of variance results regarding profitability indicated no overall statistically significant differences between actual results (neutral) feedback and exception (negative) feedback, although the literature review had suggested exception feedback should be associated with lower performance. In the study, overall means for profitability were not even in the expected direction. Only among subjects assigned the higher budgets were results in the expected direction. Both the Tukey and Scheffe multiple comparison tests indicated pairwise comparisons of feedback effects on profitability were slightly significant. To summarize, the experimental results indicated that
exception (negative) feedback resulted in lower profit performance than actual results (neutral) feedback when budget levels were set fairly high, but that actual results feedback was associated with lower profits when budget levels were low.

The second experimental hypothesis concerned the effects of different types of feedback on compliance. Results obtained from applying analysis of variance procedures again indicated that the hypothesis of no differences between different feedback types could not be rejected. Although the differences between feedback types were not statistically significant, the overall means for the two feedback types were at least in the expected direction. This overall result was due to a larger difference between the feedback types at the lower budget level over the difference at the higher budget level. The outcome anticipated from the literature regarding feedback type and compliance was that compliance would be lower with exception (negative) feedback than with actual results feedback. This expectation was qualified due to the deliberate conflict between profitability and compliance which had been induced into the experimental task. Subjects could not achieve the highest performance possible on both profit and compliance dimensions during any one decision period. However, subjects could perform moderately or poorly on both dimensions at the same time. A closer examination of the means indicated that subjects showed lower compliance with exception feedback only at the lower budget level. Pairwise comparisons indicated that differences in compliance due to alternative feedback
treatments were highly significant at the lower budget level and slightly significant at the higher budget level. To summarize, exception (negative) feedback was associated with lower compliance at the lower budget level in the experiment but with higher compliance at the higher budget level.

The third and fourth experimental hypotheses concerned the effects of different goal or budget difficulty levels. The outcomes that were anticipated on the basis of previous studies were dependent on how subjects perceived the more difficult budgets. Results from the post-experimental questionnaire indicated that subjects perceived these higher budgets as "challenging" rather than "impossible" (see Appendix C for further details). The perception of the more difficult budgets as challenging led to the anticipation of the alternative outcome that higher budgets would be associated with higher profitability and higher compliance.

Once again, analysis of variance procedures indicated no overall differences in profitability between the two budget levels. Although the overall profitability means for the different budget levels were in the expected direction (higher profitability associated with higher budgets), this result was due to larger differences in the expected direction in the actual results feedback condition. In the exception feedback condition, profitability was lower at the higher budget level than at the lower level. Pairwise comparisons indicated that budget level differences were significant in only the actual results feedback condition. To summarize the results regarding budget level (goal difficulty)
and profitability, the experimental data indicated that more
difficult budgets or goals were associated with higher profita-
bility given actual results (neutral) feedback, but were related
to lower profitability given exception (negative) feedback.

Analysis of variance procedures also indicated there were
no significant differences in compliance between the two budget
levels. The anticipated outcome of higher compliance with more
difficult budgets was realized only with exception feedback.
Subjects who received actual results feedback showed less com-
pliance when assigned more difficult budgets. Pairwise comparisons
of compliance scores indicated that budget level differences were
significant with both feedback conditions at varying levels of
significance. In summary, the experimental results indicated
more difficult budgets were associated with higher compliance
with exception (negative) feedback and with lower compliance
given actual results (neutral) feedback.

The fact that the experimental results did not concur with
the anticipated outcomes at the outset of the study, while disappoi-
ting, is not surprising when one considers the exploratory
nature of both the research and the research methodology. The
statistically significant interactions between budget difficulty
levels and types of feedback were unexpectedly disordinal,
intimating that the relationships between the investigated
variables and performance are more complex when the variables
are considered together rather than individually as has often
been done in the past. Alternative explanations of the interaction effects will be offered in the Conclusions section of Chapter Five.
CHAPTER FIVE

SUMMARY AND CONCLUSIONS

The first section of this final chapter briefly summarizes and reviews the research effort. The second section presents a discussion of the conclusions which are warranted by the data analysis and includes alternative explanations of the data. The limitations of the study are discussed in the third section of the chapter. The concluding section outlines the directions to be taken by future research, focusing on the area of evaluative feedback.

I. Summary of the Research

Performance measurement and reporting have been focal points of investigation in the current research effort. Performance measurement is an essential component of organizational control. It enables the evaluation of organizational participant performance by reporting how an individual or unit is proceeding toward, or contributing to, the goals of the organization. In addition, performance measurements can integrate individual participant goals and organizational objectives by relating individual effort to organizational incentives. Performance measurements, which inform individuals of the relative successes or failures associated
with their performance, also have psychological implications that affect the behavior of their recipients.

Performance measurements are important to the control system because they are essential factors in assuring organizational control. Organizational control is necessary to ensure that organizational resources are obtained and used effectively and efficiently in the accomplishment of organizational objectives. Organizational control involves the cycle of establishing plans and objectives, of measuring behavior or performance, of evaluating performance and performance measures, of following through on performance evaluation with rewards and punishments, and finally of revising objectives and plans as necessary. For effective organizational control, performance measurement and evaluation must be consistent with the goals of both the organization and its individual participants.

Effective performance measurement and reporting are the responsibilities of accounting systems. A basic premise of this research effort has been that the evaluative nature of feedback contained in accounting reports have associated with it, certain effects beyond that of providing information regarding profit and cost outcomes. For this reason, the relationship between performance and the behavioral consequences of evaluative feedback is of interest to accounting systems, the sources of such evaluative information. In the past, accounting control systems have failed to consider the importance of behavioral factors due to a traditional orientation towards authoritarian beliefs.
The authoritarian view of human participants in business organizations has been that individuals perform their organizational roles for extraneous considerations such as pay or social incentives. Performance is believed to occur in response to rules and to the recognition that some performance effort is necessary to secure wages and retain those jobs upon which rewards are contingent. The traditional view has also been that performance should be monitored by various control systems which transmit performance information to upper management levels.

In accordance with this traditional outlook, accounting control systems have transmitted performance information that involved such end-result variable measures as profitability and productivity. End-result variable measures are of great interest to various users - both internal and external to the daily functioning of organizations. However, to internal managerial users of accounting reports, there are other measures that should be of parallel interest in ascertaining the quality of performance of the organizational participants. These other measures assess behavioral factors that are considered to be useful to the efficient functioning of organizations - such factors as reliability, loyalty and compliance. In the current study, these behavioral factors have been referred to as intermediate variables. The theory suggested in the earlier chapters was that intermediate variable measures may sometimes reflect organizational performance in a more timely manner than traditional end-result measures which often reflect performance on a lagged basis. Both end-result and
intermediate variable measures were included in the study in the
belief that both types are significant in performance measurement
and reporting.

In order to better understand the association between per-
formance measurements and organizational control systems, models
of the relationship were presented for two situations. The two
situations considered in the models were "ideal" (Figure 1) and
"imperfect" (Figure 2). The latter situation was believed to
have the greater application since imperfections and uncertainties
comprise the realities with which organizations must contend. The
models considered various variables and behavior outcomes in organ-
izations which are related to performance measurement in organiza-
tional control systems.

In the imperfect situation model, lack of congruence between
individual and organizational goals was considered to be likely.
Many organizational rewards fail to be directly linked to good
performance and often merely follow minimally acceptable perfor-
mance. When rewards are not closely related to performance,
managers may tend to concentrate upon their own goals, rather
than upon those of the organization. In formulating their indivi-
dual goals in the organization, managers are affected by a variety
of factors other than organizational goals (which are conveyed to
them through the departmental budget) such as past performance
outcomes, past evaluations by superiors, organizational rewards,
peer effects and various individual motivational factors. When
individual goals are translated into individual behaviors in the
organization, certain organizational outcomes result from the collective behaviors of all the participants in the organization. These organizational or actual outcomes are unlikely to correspond exactly to the outcomes that had been desired by the organization. In addition, there are shortcomings in the accounting system of performance measurements which measure neither all the desired organizational outcomes nor all the actual organizational outcomes. As previously discussed, accounting measurements comprise only a subset of the total set of actual organizational outcomes, specifically quantifiable outcomes. To complete the control cycle model, performance measurements and reports are conveyed to the relevant managers and their superiors for performance evaluation and possible goal reformulation. The relationship between performance measurements and the organizational variables contained in the model underlines the importance of performance measurements in organizational control systems. It also indicates that the responsibility of accounting measurement systems goes beyond the provision of a narrow set of performance measures and includes a multitude of performance factors such as intermediate variable measures which may sometimes be difficult to quantify. A contention of the current study has been that the performance measurement set should be enlarged to include behaviors, particularly those at the intermediate rather than the end-result level, which have not been quantified in the past.

Since the number of intermediate behavioral indicators available are extremely numerous, it was necessary to limit the
current investigation to a specific intermediate variable that would be observed during the experimental study. For various reasons explicated in Chapter Three, compliance was selected as the representative intermediate variable that would be observed in the investigation of performance reporting by accounting systems. In addition, the relationship between performance reports and the traditional end-result measure, profitability, was examined.

The investigation was interested in the performance effects of evaluative feedback, an interest that represented only a portion of the relationship between performance measurements and organizational behavior. This relationship can be considered as comprised of two stages. The first stage involves the resultant effects of performance reports which are transmitted to and interpreted and evaluated by relevant managers and their superiors. The second stage involves superior-subordinate interaction effects as superiors directly or indirectly transmit their evaluations of subordinate performance partially based on performance reports. The focus of the current study, effects of performance reports, involves one segment of the first stage.

Since the focus of the study was on the effects of performance reports and since internal accounting reports have traditionally been biased toward negative outcomes, the negative feedback phenomenon was investigated. The literature on feedback and in particular, evaluative feedback, was reviewed in Chapter Two. The evidence in the literature indicated that performance feedback was an important factor in shaping work behavior. Furthermore, there were some
indications that negative forms of feedback were inferior to positive forms. In some instances, negative feedback was found to be detrimental to overall performance. However, there were some difficulties in directly applying the results of feedback studies to accounting measurement and reporting.

To investigate whether negatively-oriented accounting reports are detrimental to organizational performance, an experimental study was conducted to explore this possibility. In considering the effects of performance reports or feedback, the model in Figure 2 suggested that organizational and individual goals were important components of the organizational control system. Past studies in budgeting have also intimated that goal difficulty is an important determinant of performance outcomes and, therefore, of organizational control. For these reasons, the study considered the effects of both budget difficulty and evaluative performance reports on performance outcomes in the experimental stage of the research.

The laboratory experiment utilized a 2 X 3 design with budget difficulty represented at two levels and performance reports (type of feedback) represented by three conditions - neutral, negative and none. Thus the two independent variables manipulated in the experiment were (1) goal difficulty and (2) type of feedback, while the dependent variables were profitability and compliance. During data analysis, the two control groups (the no feedback groups) were excluded from further consideration when it became obvious that they had failed to serve their original purpose of discerning
learning effects.

A total of 36 subjects participated in the experiment with six subjects being assigned to each of the six experimental treatment groups and control groups. The subjects were accounting majors who were recruited from intermediate and senior accounting courses given at The Ohio State University during the Spring Quarter of 1976. Each experimental session lasted approximately two hours for which each subject was paid $5.00.

The experimental task involved decision-making with regard to a production problem. Subjects were requested to make decisions over ten periods by allocating two raw materials for the production of two types of finished units. There were fixed amounts of each of the two types of raw materials which were available in each decision period and no carry-overs of raw materials or finished goods inventories.

Subjects were informed that the purchase costs of raw materials and the selling prices of finished products were determined randomly. These purchase costs and selling prices changed from period to period and were provided to subjects at the beginning of each decision period. The maximum limits of the quantities of each of the two finished products that could be sold in any one period were also disclosed to subjects at the beginning of the experimental session. Subjects were assigned profit budgets at the beginning of each of the ten decision periods and were informed at the beginning of the experimental session that their goal was to meet or exceed the budgets assigned to them. Although subjects had unlimited production
capacity, the division to which subjects were assigned as managers had certain fixed costs to discourage decisions not to produce. Toward this end, marginal revenues always exceeded marginal costs in all the experimental decision periods.

The major hypotheses of the study were that profitability and compliance would not differ across the three types of feedback or over the two budget levels incorporated in the experiment. The results from previous studies indicated some outcomes that might be anticipated with regard to the experimental hypotheses. The first expected outcome regarding type of feedback was that both profitability and compliance would decrease as feedback became negatively-oriented. The second expected outcome was that both profitability and compliance would be greater with less difficult budgets than with more difficult budgets if the higher budget treatment in the experiment operated as intended such that subjects perceived the high budgets as impossible to attain.

Unfortunately, a post experimental check of the independent variables indicated that the high budget variable did not operate as desired. The budgeting literature had suggested that some budgets are associated with better task performance than are other budgets. These studies indicated that higher budgets are associated with better performance up to some unidentified critical level. Budgets beyond this critical level were associated with decreased performance. However, little was known about the critical level and it was necessary to utilize arbitrary goal difficulty levels in the study with the hope that they would operate as desired.
The intention at the beginning of the experiment was to gather insight with regard to the critical level of goal difficulty. Towards this end, it was desired that one budget level would be below the critical level and the other budget level above it. Post-experimental inquiries indicated that both budget levels utilized in the experiment appeared to be below the critical level. Apparently the goals in the higher budget were not sufficiently difficult so as to be perceived as impossible to attain.

Since budget level treatments had not functioned as had been desired, it became necessary to resort to the alternative expectations relevant to the situation where neither budget was perceived as impossible to attain. With both budget level treatments below the critical level of goal difficulty, the revised expectations were that profitability and compliance would be higher in the more difficult goal level treatment than in the less difficult budget treatment groups.

Analyses of the experimental data indicated that the experimental hypotheses of no differences between different budget levels and over different types of feedback could not be rejected. Analysis of variance procedures found that the main effects (the effects of the two independent variables) were not statistically significant. However, statistical significance was found for interactions in both the dependent variables of profitability and compliance. Due to the significance of the interactions, further statistical analyses were conducted on the data in order to gain insight into what had occurred during the experiment. These analyses indicated significant
differences in many pairwise comparisons of experimental treatment groups for both profitability and compliance.

The literature review had indicated that negative forms of feedback result in lower performance than neutral or positive forms of feedback. Therefore in the experimental study, the treatment groups receiving negative (exception) feedback had been expected to fare more poorly with regard to the profitability of their decisions than those groups receiving the more neutral (actual results) type of feedback. Results obtained from applying analysis of variance procedures indicated that this expectation was not statistically supported. Only when the groups receiving more difficult budgets (high goal difficulty) were considered separately were the treatment group means in the predicted direction. However, the groups receiving less difficult budgets (low goal difficulty) reacted strongly in the opposite direction such that the overall means for profitability were not in the expected direction. Tukey and Scheffé's multiple comparison tests indicated the pairwise comparisons of profitability data for feedback effects were statistically significant.

Compliance was also expected to be lower with negative feedback than with neutral feedback although this expectation was qualified due to the deliberate conflict between profitability and compliance which had been induced into the experimental task. Analysis of variance procedures had indicated no statistically significant differences between feedback types. However, in the case of compliance the overall means for the two feedback types
were in the expected direction, albeit statistically insignificant. This overall result was due to the large difference between the means of the experimental treatment groups at the lower budget level. This difference was somewhat countered by the groups given more difficult budgets who reacted in the opposite direction. Subjects receiving negative feedback exhibited greater compliance at the lower budget level than did subjects receiving neutral feedback. Pairwise comparisons indicated high statistical significance for the differences between the means at the low budget level and slightly less statistical significance at the higher budget level.

The expectation concerning profitability and budget levels was that the groups receiving more difficult budgets would exhibit higher profitability than would the groups receiving less difficult budgets. Analysis of variance procedures indicated no overall differences between the two budget levels. Although the overall profitability means for the different budget levels were in the expected direction, this result was due to larger differences in the expected direction in one experimental feedback condition (neutral or actual results). Profitability was, in fact, higher with the less difficult budget given negative feedback conditions. The multiple comparison tests indicated that only the goal difficulty differences in the groups receiving neutral feedback were statistically significant.

Compliance was also expected to be greater in the groups assigned the more difficult budgets. Once again, this expectation was qualified since the experimental task did include a conflict
situation between profitability and compliance. Analysis of variance results indicated no statistically significant differences between levels of budget difficulty. The expectation of higher compliance with more difficult budgets was realized only with exception feedback. Subjects receiving neutral feedback showed greater compliance when assigned less difficult budgets. Pair-wise comparisons of compliance scores at the two budget levels indicated statistical significance for both comparisons.
II. Conclusions

Statistical analyses of the experimental data indicated that main effects regarding the two independent variables, type of feedback and goal difficulty, were not present but that an interaction effect between the two variables was present and was statistically significant. Significant interactions were indicated between the independent variables, goal difficulty and type of feedback, for both dependent variables, profitability and compliance. Under the pressure of more difficult goals (high goal difficulty), subjects receiving neutral (actual results) feedback demonstrated higher profits and lower compliance while subjects receiving negative (exception) reports exhibited lower profits and higher compliance. Subjects assigned less difficult goals (low goal difficulty) exhibited lower profits and higher compliance with neutral feedback and higher profits and lower compliance with negative feedback. Stated from a different perspective, subjects given neutral feedback demonstrated higher profits and lower compliance when assigned more difficult budgets and lower profits and higher compliance when assigned less difficult budgets. Subjects given negative feedback demonstrated lower profits and higher compliance when assigned more difficult budgets and higher profits and lower compliance when assigned less difficult budgets.

Explanations of the interactions observed in the study are manifold. The explanations of the interactions that follow are offered as hypotheses which may serve as post hoc explanations of the results obtained in the experimental study. These
explanations are tentative and conjectural in nature. Their validity can be determined only through careful future empirical study.

One possible explanation of the interactions between budget levels and types of feedback is that some critical level or threshold of pressure tolerance exists for a specific action, task or job. Perhaps individuals can cope, or are willing to cope, with only limited amounts of pressure in an effective manner. Increases in pressure up to the critical level may lead to increases in performance levels, but pressure administered beyond the critical threshold may lead to declines in performance level. There are at least two possible explanations for the existence of a threshold of pressure tolerance. First, individuals may be physiologically limited in their ability to cope with unpleasant situations. Different individuals may differ in degree of tolerance but every individual may have some level beyond which ability to react effectively is lost. An alternative explanation is that beyond certain pressure levels, individuals are unwilling to react effectively. They may resent their situation and lose interest in a task they find unrewarding.

In the experimental study, subjects demonstrated higher profits with either difficult goals or negative feedback, but performed poorly when presented with both. If a critical level of pressure tolerance exists, the results of the current study suggest a low threshold for this particular type of task. If critical thresholds of pressure tolerance do exist, it is likely
that they vary not only across individuals but also across situations.

A second explanation of the interactions may be that subjects differ in their approaches to dealing with conflict situations. The experimental subjects were faced with a choice between two desired outcomes - profitability or compliance. Some subjects may have randomly opted to emphasize one or the other of the desired outcomes in any particular decision period. Other subjects may have determined a decision strategy which enabled them to achieve profits close to their budgets. These subjects may have been unwilling to stray from their optimal strategy. Still other subjects who were encountering difficulty in attaining budgeted profits may have turned to high compliance as an acceptable alternative to high profitability. An examination of compliance scores across periods seven through ten indicates some subjects were consistent in their compliance level across different periods while others varied widely from period to period. This second explanation does not, however, account for the statistical significance of the differences between treatment means.

A third possible explanation of the interactions is that of differential motivation resulting from different combinations of independent variables. Certain combinations of the independent variables may have motivated subjects in the study to produce higher profit or higher compliance. If this explanation is valid, the combination of high goal difficulty and neutral feedback was the best combination for generating higher profits, followed by
the lower goal difficulty and negative feedback combination. The greatest pressure to generate high profits occurred in the group which showed the second lowest profits among the experimental groups. This group received the treatment combination of higher goal difficulty and negative feedback. The poorest combination for generating profitable decisions was lower budget difficulty and neutral feedback, the combination which was closest to a laissez-faire arrangement among the experimental groups. For compliance, the best combination was lower goal difficulty and neutral feedback followed fairly closely by the combination of higher goal difficulty and negative feedback. The two poorer combinations, in order, higher goal difficulty and neutral feedback and lower goal difficulty and negative feedback, were considerably below the higher two treatment combinations.

Another explanation of the presence of interactions may be that certain combinations of treatment effects manifest themselves in the short-run as was the case in the study, and certain others in the long-run. The effects of still other combinations may not be sensitive to the passage of time and may be discerned in both the short- and long-run. Some of the treatment combinations in the experiment may have revealed temporary effects that would not continue over a relatively lengthy period of time. On the other hand, some treatment effects may not manifest themselves in the short-run and become obvious only over a longer period. The latter effects would not have been captured in the experimental study which was of short duration.
A further possibility is that intervening variables interfered in the performance outcomes observed in the experiment. Although the random assignment of subjects to experimental treatment groups should have reduced these effects, control over some of these variables may have reduced mean square error particularly since cell sizes were fairly small. One possible intervening variable is intelligence which may have affected subject ability to limit his decision search to the appropriate alternatives. Search limitation would have facilitated superior decisions insofar as subjects were under time constraints during the experimental session. A second intervening variable may have been ability to cope with uncertainty. The experimental task involved uncertainty with regard to the maximum sales possible for the two finished products in any one decision period. A third intervening variable possibility is ability to cope with conflict situations. Subjects may have differed in their ability to resolve the conflict: some may have reacted severely in one direction or another while others may have attempted to satisfy both demands as closely as possible. Another possible candidate as an intervening variable is the inner-directedness or outer-directedness of individual subjects which may have influenced their behaviors. Inner-directed individuals consider outcomes to be affected by their own behavior while outer-directed persons attribute outcome responsibility to individuals or forces outside their control. In the experimental situation, inner-directed subjects may have sought
better decisions while outer-directed subjects may have felt
decision searches to be largely immaterial to the ultimate profit
outcomes. There are doubtlessly other intervening variables
other than those offered here that may be responsible for the
presence of interaction effects in the experiment. It is diffi-
cult to list all these possibilities and the speculative nature
of such explanations restrict the usefulness of extensive listings.

Finally, a more comprehensive explanation of the presence
of interaction effects is possible based on studies of task-goal
attributes. Steer and Porter have suggested that six task-goal
attributes (characteristics or dimensions of an employee's task
goals) are indicated in the organizational setting. These attri-
butes are goal specificity, participation in goal setting, feedback
on goal progress, peer competition for goal attainment, goal
difficulty and goal acceptance. All these attributes are posited
as related to an employee's motivation to perform.

In general, findings in past studies have indicated that
performance increased when higher goals had been set. Also, fairly
consistent evidence has emerged that a positive relationship exists
between feedback and performance. In addition, past studies have
indicated something more complex exists between task goals and
performance: the influence of task-goal attributes on performance
appears to be predicated largely on their effect upon goal accept-
tance or non-acceptance. For example, the studies by Locke and
his colleagues indicate that feedback affects performance only to
the extent to which subjects set higher performance goals in
response to such feedback.

The current study specifically considered two of the task-goal attributes listed above: feedback on goal progress and goal difficulty. The results of the experimental study support the theory regarding the complexity of the relationship between specific task-goal attributes and performance. In the context of attribution theory, the experimental results suggest that goal difficulty combines with feedback in prompting differing degrees of goal acceptance. The presence of interaction effects in the study suggest that the combinations of difficult goals and neutral feedback and of moderate goals and negative or critical feedback are conducive for goal acceptance. The combinations of moderate goals and neutral feedback and of difficult goals and negative feedback did not appear to enhance goal acceptance.

A general implication of the experimental results is that performance is predicated upon a number of factors operating in the work environment. These factors, in combination, impact upon performance - their specific impact dependent on the "mix" of the situational variables affecting individual willingness to perform.

A specific implication of the results of the study is that the effect of information presented by accounting systems are contingent upon other factors in the job situation. In the short-run at least, negatively-oriented accounting reports may not be detrimental to performance and may motivate their recipients towards improved performance if other pressures and factors do
not interfere. However, if performance goals are set at challenging levels, negative-oriented accounting reports appear to be significantly inferior to more neutral reports. Given challenging goals, negative reports do not appear to motivate subjects toward better performance, a conclusion in agreement with past studies on reinforcement and feedback. The research suggests that negatively oriented reports may not warrant the unquestioning acceptance currently exhibited in accounting practice. Although further study is necessary before valid conclusions can be drawn, the current study does suggest further research regarding the impact of negatively-oriented accounting reports is warranted. In addition, the data suggests that optimized profits or minimized costs are not the only relevant measures of performance. Subjects in the experiment who performed poorly with regard to profits were demonstrating better performance with regard to another dimension (compliance). Although experimental subjects were required to choose between profitability and compliance, they still retained the option of ignoring both; few subjects were low on both dimensions. The experimental results suggest that performance reports which focus only on revenues, expenses, profits and variances from budgets may be myopic. Attention directed towards other dimensions may be responsible for an individual or group's poor performance on the profit dimension.

The experimental study represented an introductory attempt to determine the impact on performance of accounting information presentation alternatives. As such, future research must be
conducted before any conclusions can be reached regarding the role of information presentation in performance reports. In addition, the role that intermediate variables such as compliance may play in accounting information presentation was not fairly examined in the study. The conflict between intermediate and end-result variable measures obscured the relevance and importance of intermediate variables. The study did attempt to incorporate psychological theories regarding reinforcement and feedback into the accounting framework. Although this attempt was limited by problems in the experimental design, the presence of interaction effects attest to some impact of evaluative presentations of accounting information.

The direct implications for accounting practice of the experimental results are limited by the abstractions and simplifications introduced in developing the laboratory experiment. A related restrictive factor is the artificiality of the laboratory experiment design. The problems associated with the experimental design will be discussed in the following section.
III. Limitations of the Research

One of the usual criticisms raised against experiments which have insignificant results for some of the experimental variables is that of poor experimental control. A stricture that might be cited against the current study in support of that contention is that error variance is so large as a result of poor experimentation procedures and extremely large differences in variables are necessary for significance. A second criticism that might be made against the study involves the small sample size of six per cell which can be argued to contribute to suspicions regarding experimental results.

The most important evidence that counters the charge of sloppy experimental control is the closeness of the scores of the different experimental groups and the result of significant interactions. A review of the analysis of variance tables indicates that the F ratios for the main effects are very small. Although efforts to reduce mean square error would undoubtedly have increased these F ratios, the differences between the size of main effects and interaction effects suggest that interaction effects have a much more powerful effect on performance than do either of the two main effects individually.

A third criticism of the study is that the experimental task was too repetitive - subjects were bored and consequently showed high variability in their performance. This criticism is valid. Although repetitiveness was desired in order to eliminate learning effects, the high variability of the profit scores during the
experiment suggest that ten decision periods were excessive. The variations in the profit scores during the middle decision periods particularly attest to this conclusion. At the same time, the lengthy preamble to the introduction of the compliance suggestion in period seven probably did eliminate differences in learning by that time.

A general limitation of the experiment is that results are conditional on a specific subject population, namely accounting students available at The Ohio State University during the time of the experiment. The representativeness of the behavior of these subjects for the behavior of organizational participants is an open question. The use of subjects from one institution during a specific period of time was a consequence of the practical limits of available resources for research. The selection of one specific subject group as opposed to the more general group of university students was the result of trading definability, homogeneity and knowledge of the subject group for the possibility of a more general inference. The more diverse the subject population, the greater would have been the performance variance within the study. The less knowledgable the subject group regarding accounting concepts and reports, the less likely would have been the ability of the subjects to perform the experimental task.

The experimental task employed in the study further restricts the results to be conditional on the task. It is difficult and probably impossible to acquire an experimental task that is completely generalizable. However, the patent artificiality of the
experimental setting with its contrived task and data impedes the
generality of the results. The experimental task did not involve
job procurement or security, had no attendant rewards or payoffs
directly related to performance and, consequently, did not
include organizational realism. An inclusion of monetary incen-
tives based on performance would have overcome the problem of
performance payoffs and may have reduced somewhat the artificiality
of the experimental setting. Monetary incentives were excluded
from the current research in order to avoid the confounding effects
resulting from differential subject reaction to small monetary
incentives.

A task-related limitation was the failure to establish
effective control groups in the experiment. These groups did not
function in the experiment as desired due to the nature of the
experimental task. The task required subjects to learn the
mechanics of decision-making which required a certain amount of
feedback. This necessitated the presentation of feedback reports
to control subjects during the first three decision periods. As
a result, the performance of these subjects in subsequent periods
could not be attributed to only a lack of feedback. Their perfor-
manve may also have been influenced by the "denial" of feedback
in periods four through ten. A tangential problem involved subjects
in the experimental groups who did not receive the same type of
feedback during the learning periods. This was necessary to ensure
that performance in the negative feedback treatment would not be
confounded by a switch in period four from a neutral report to a
negatively-oriented one. Differential learning effects may have been present in the experimental results although only the results from period seven onward were utilized in data analysis.

The experimental design also posed a number of problems. Subjects did not work in the environment for an extended period of time and the environment they did work in was highly sterile. Although the exclusion of non-experimental variables is a benefit of the laboratory experiment, it was also a problem. The laboratory experimental setting generated a higher-order problem-solving task for subjects: that of reacting to the procedures and experimental treatments not only for their stimulus values but also for their cues in divining the intent of the experimenter. Out-guessing the experimenter and "I'm a guinea pig" attitudes and whatever else was generated by the experimental setting are unrepresentative not only of organizational setting behavior, but even of behavior in the university setting. Another problem associated with the experimental design was the one-time nature of the experiment with its associated problems of one-time effects and high score deviance.

Specific limitations of the experiment include the effects, if any, of differences in verbal task descriptions or redefinitions requested by certain subjects. Provision of such descriptions and redefinitions were considered necessary to facilitate subject learning of the experimental task.

Another specific restriction is the unknown effects of waiting time necessary after decisions had been made in each period. The experimental set-up required that subjects wait after each decision
for the computer to process their decisions and provide performance reports and budgets for the following period. Although the waiting period averaged only a few minutes, there were some instances when the waiting period was somewhat longer. Longer waiting periods resulted from computer difficulties including breakdowns on two occasions or two subjects completing their decisions and thus requiring computer services simultaneously.

The effects of other subjects in the same experimental session were unknown although communications between subjects were not allowed and subject-experimenter communications were minimized. One further specific limitation of the study was that profitability and compliance were conflicting outcomes. This obfuscated the possibility of drawing conclusions regarding the relationship of intermediate performance variable measures to end-result measures.

The statistical problems of the data have apparent shortcomings. The lack of normality in some of the treatment groups was an ubiquitous problem throughout the statistical analyses of the data. Finally, the problems associated with a small sample size present an additional weakness in the study.
IV. Extensions of the Research

The direction of future research lies in clarifying the effects of all the factors that prompt or discourage goal acceptance. Assuming such goals have been set with reference to organizationwide goals, goal acceptance is positively related to increases in performance levels. A better understanding of goal-related factors would be useful insofar as the degree to which goals are met largely determines the ultimate failure or success of organizations in meeting their overall objectives.

Results of the current study suggest that goal-related factors or attributes can improve performance depending on the presence or absence of other factors or attributes. The experimental situation that corresponds most closely to business situations - moderate goals and negative feedback - proved non-optimal for both performance measures utilized in the study. This result questions the efficacy of negatively-oriented information supplied by accounting systems in stimulating increased performance levels. The experimental results suggest that a shift from the moderate goal, negative feedback situation to the more difficult goal, neutral feedback situation may be desirable.

Further research effort should be directed toward exploring the effects of evaluative accounting information. A replication of the current experiment is not recommended due to the problems associated with the experimental procedures. Different techniques are necessary to improve research results and remove inconsistencies. With respect to subject group, organizational workers or managerial
groups are preferable to broaden the conclusions of research in this area.

The effects of evaluative feedback in general and accounting feedback in particular, merit further investigation. The relationship between accounting information and managerial feedback behavior may significantly influence organizational performance in other ways. How superiors interpret accounting information and how they interact with their subordinates as a result of accounting information involve broad organizational implications regarding behaviors and attitudes.

A study of the interpretation of accounting information has been suggested as representing the first phase of an evaluative accounting feedback research program. The results of the current study suggest that certain forms of evaluative accounting reports have some impact on performance but left unexplored numerous other forms of evaluative accounting reports. Studies on how accounting information is perceived by recipients and how it prompts goal acceptance are necessary before conclusions can be drawn regarding the full impact of evaluative accounting reports.

The effects of positively-oriented accounting reports were not considered in the current study due to the rarity of such reports. The uncommonness of such reports should not necessarily exclude them from future research consideration. An investigation of positively-oriented accounting reports would seem to be a logical component of a complete investigation of the effects of evaluative accounting feedback.
The second phase of an evaluative accounting feedback research program would involve the study of how superiors, armed with accounting reports, interact with subordinates as a result of those reports. This phase includes various areas of study such as leadership styles and social exchange theory as they relate to accounting systems. It may also include investigations into such questions as how managers perceive pressure from superiors for improved performance on the basis of differing presentations of accounting performance information.

Finally, the consideration of intermediate variables as relevant measures of organizational performance deserves more careful investigation than was bestowed during the experimental phase of the current research. Studies examining the timeliness of such intermediate variables may be of particular significance in providing early cues regarding participant disaffection for the organization and its objectives.
APPENDIX A

EXPERIMENTAL MATERIALS

The following exhibits represent the material given to subjects during the experimental session.

Exhibit 1: The problem assigned to subjects
Exhibit 2: A sample budget
Exhibit 3: Sample performance reports
Exhibit 4: A sample memorandum from the company president
Exhibit 5: A sample decision form
Exhibit 6: The post-experimental questionnaire
Exhibit 7: The achievement motivation questionnaire
Exhibit 8: The need for self-esteem questionnaire

In the study, the achievement motivation questionnaire and the need for self-esteem questionnaire were combined into a single questionnaire. The need for self-esteem questions were scattered between the achievement motivation questions. Subjects were requested to circle the best alternative in the combined questionnaire.
EXHIBIT 1

The Problem Assigned to Subjects

As the manager of the Crown Division of the Royal Cascade Fancy Foods Company, you must make a decision regarding the production activity in your division. Your goal, as manager, is to meet or exceed the budget assigned to your division at the beginning of each period. Although the entire budget should serve as a guideline, you should concentrate on meeting or exceeding the budgeted net income.

The production activity in your division consists of the production of two items - Alpha Snacks and Beta Snacks. Both types of items are produced from two types of raw materials A and B. Five units of A and 2 units of B are necessary to produce one unit of Alpha Snacks (that is, 1 Alpha = 5A + 2B). Three units of A and 6 units of B are necessary for one unit of Beta Snacks (1 Beta = 3A + 6B).

The market for Alpha and Beta Snacks varies from period to period. Crown Division can sell anywhere between 20 to 30 units of Alpha Snacks during any one period, and between 15 and 25 units of Beta Snacks. The selling prices of Alpha and Beta Snacks are determined by market conditions and are likely to change in each period. At the beginning of each period, you will receive price information for the period regarding Alpha and Beta Snacks and raw materials A and B along with your budget. (The unit costs of A and B also change from period to period.)

There are 150 units of A and 150 units of B available to the Crown Division in each period. You may purchase as many (or as few)
units of A and B as you desire in each period, up to 150 units of each raw material. The production capacity of your division is such that it can accommodate 150 units each of A and B. However, the purchase decision (the number of units of A and B to purchase) and the production decision (the number of units of Alphas and Betas to produce) must be made carefully insofar as all the products are perishable. A's and B's purchased during any one period and not utilized during that period will spoil and must be discarded. Similarly, Alpha and Beta Snacks produced during the period and not sold by the end of the period will spoil and must be disposed.

There are various other costs to be considered in the Crown Division. Labor costs necessary to produce one unit of Alpha are $150; for one unit of Beta $90. Fixed manufacturing costs total $3,000 per period. Variable selling costs equal 10% of sales and fixed selling and administrative expenses are $5,000 per period. Since the selling and administrative expenses (total) are dependent on sales, these costs are more or less beyond your control.
EXHIBIT 2

A Sample Budget

Crown Division

Budget for Period 3

Sales Revenue $34,000
Manufacturing costs 15,600
Selling & administrative costs 8,400
Budgeted Net Income $10,000

Prices for Period 3

Prices per unit: A $40  B $15

Alpha $1,000  Beta $1,000
EXHIBIT 3

Sample Performance Reports

A. Sample of Actual Results Feedback Report

Crown Division

Performance Report for Period 10

Sales Revenue $48,400
Manufacturing Costs 14,910
Selling & Administrative Costs 9,840
Net Income $23,650

Units Sold: Alphas 24 units; Betas 10 units.

B. Sample of Exception Feedback Report

Crown Division

Performance Report for Period 10

Failed to achieve Sales budgeted by $5,400
Exceeded budgeted Manufacturing costs by $1,400
Failed to achieve budgeted Income by $6,260

Units Sold: Alphas 24 units; Betas 0 units.
EXHIBIT 4

A Sample Memorandum from the Company President

MEMORANDUM

To: Manager, Crown Division

From: President, Royal Cascade Fancy Foods Company

In the interests of the company's long-run intentions of concentrating on less expensive products, it is suggested that a greater number of units of Beta Snacks be produced, such that at the minimum, more Beta than Alpha Snacks are produced in each period.

EXHIBIT 5

A Sample Decision Form

Crown Division

Manager _____ Period _____

Raw materials purchased: A _____ units B _____ units

Units produced: Alphas _____ units Betas _____ units

Profit intended for Crown Division: $ _________

Profit expected for Crown Division: $ _________
EXHIBIT 6

The Post-Experimental Questionnaire

Please check the most appropriate alternative in each of the following questions.

1. How did you make your decision in each period?
   ___ By estimating sales.
   ___ By determining contribution margins.
   ___ By estimating sales and determining contribution margins.
   ___ Other (please explain):

2. Overall, how did you perceive your assigned budgets?
   ___ High and impossible.
   ___ High and challenging.
   ___ Moderate.
   ___ Relatively easy.

3. How would you evaluate your overall performance at the task?
   ___ Very good.
   ___ Good.
   ___ Average.
   ___ Poor.
   ___ Extremely poor.

4. How useful were the performance reports you received?
   ___ Very useful.
   ___ Useful.
   ___ Not very useful.
   ___ Not useful at all.

Comments you would like to offer with regard to the study (if any):
EXHIBIT 7

The Achievement Motivation Questionnaire

1. Other people think
   a. I work very hard.
   b. I work hard.
   c. I work pretty hard.
   d. I don't work very hard.
   e. I don't work hard.

2. I usually do
   a. much more than I resolved to do.
   b. a bit more than I resolved to do.
   c. about what I resolved to do.
   d. a little less than I resolved to do.
   e. much less than I resolved to do.

3. If I have not attained my goal and have not done a task well, then
   a. I continue to do my best to attain the goal.
   b. I exert myself once again to attain the goal.
   c. I find it difficult not to lose heart.
   d. I'm inclined to give up.
   e. I usually give up.

4. To prepare yourself a long time for an important task
   a. is really senseless.
   b. is often unproductive.
   c. can often be useful.
   d. testifies to a sense of reality.
   e. is necessary to succeed.

5. When I am working, the demands I make upon myself are
   a. very high.
   b. pretty high.
   c. not so high.
   d. low.
   e. very low.

---

6. Working is something
   a. I would rather not do.
   b. I don't like doing very much.
   c. I would rather do now and then.
   d. I enjoy doing.
   e. I enjoy doing very much.

7. When I was still in high school, the standards I set for myself with regard to my studies were
   a. very high.
   b. high.
   c. average.
   d. low.
   e. very low.

8. At high school they thought I was
   a. very diligent.
   b. diligent.
   c. not always so diligent.
   d. rather easy-going.
   e. very easy-going.

9. When the teacher gave lessons at high school
   a. I usually set my heart on doing my best and making a favorable impression.
   b. I usually paid great attention to the things being said.
   c. my thoughts sometimes strayed to other things.
   d. my thoughts often strayed to other things.
   e. I was more interested in things that had nothing to do with school.

10. Beginning my homework was
    a. a very great effort.
    b. a great effort.
    c. a rather great effort.
    d. not much effort.
    e. very little effort.

11. If I was called from my homework to watch television or listen to the radio, then afterward
    a. I always went straight back to work.
    b. I would only take a short break and then go back to work.
    c. I would always wait a little before starting again.
    d. I would find it difficult to begin again.
    e. I would not try to begin again.
12. At high school I thought perseverance was
   a. very unimportant.
   b. rather unimportant.
   c. neither important nor unimportant.
   d. important.
   e. very important.

13. When I was in high school I thought that to attain a high position in society was
   a. very unimportant.
   b. rather unimportant.
   c. neither important nor unimportant.
   d. important.
   e. very important.

14. At high school I found classmates who studied very hard were
   a. very pleasant.
   b. pleasant.
   c. just as pleasant as others who didn't work as hard.
   d. unpleasant.
   e. very unpleasant.

15. Good relations with my teachers at high school
   a. were appreciated very much.
   b. were appreciated.
   c. were thought not to be so important.
   d. were thought exaggerated in value.
   e. were thought completely unimportant.

16. At high school I admired persons who had reached a very high position in life
   a. very much.
   b. a little.
   c. no more than anyone else.
   d. very little.
   e. not at all.

17. When I was in high school, I was
   a. extremely ambitious.
   b. very ambitious.
   c. not so ambitious.
   d. a little ambitious.
   e. hardly ambitious at all.
18. Work that requires great responsibility
   a. I would like to try doing very much.
   b. I would not mind trying.
   c. I would only try to do if I was paid well.
   d. I don't think I would be capable of doing.
   e. is completely unattractive to me.

19. I think a life in which one wouldn't have to work at all would be
   a. ideal.
   b. very pleasant.
   c. pleasant.
   d. unpleasant.
   e. very unpleasant.

20. Shopping is something
   a. I enjoy very much.
   b. I enjoy.
   c. I enjoy little.
   d. I don't enjoy.
   e. I dislike.

21. When doing something difficult
   a. I give up very quickly.
   b. I give up rather quickly.
   c. I don't give up too soon.
   d. I give up very slowly.
   e. I usually see it through.

22. In general, I am
   a. very strongly future-oriented.
   b. strongly future-oriented.
   c. not so strongly future-oriented.
   d. very little future-oriented.
   e. not at all future-oriented.

23. For life's extra pleasures
   a. I usually have no time.
   b. I often have no time.
   c. I sometimes have too little time.
   d. I usually have enough time.
   e. I always have time.
24. I usually am
   a. very busy.
   b. busy.
   c. not so busy.
   d. not busy.
   e. not busy at all.

25. I can work at something without getting tired for
   a. a very long time.
   b. a long time.
   c. not too long a time.
   d. only a short time.
   e. only a very short time.

26. Organizing is something
   a. I enjoy doing very much.
   b. I enjoy doing.
   c. I enjoy little.
   d. I don't enjoy.
   e. I dislike doing.

27. When I begin something
   a. I never carry it to a successful conclusion.
   b. I seldom carry it to a successful conclusion.
   c. I sometimes carry it to a successful conclusion.
   d. I usually carry it to a successful conclusion.
   e. I always carry it to a successful conclusion.

28. I am
   a. very often bored.
   b. often bored.
   c. sometimes bored.
   d. hardly ever bored.
   e. never bored.
EXHIBIT 8

The Need for Self-Esteem Questionnaire

1. It is extremely uncomfortable to accidentally go to a formal party in street clothes.
   a. strongly agree.
   b. agree.
   c. slightly agree.
   d. neither agree nor disagree.
   e. slightly disagree.
   f. disagree.
   g. strongly disagree.

2. I am never at a loss for words when I am introduced to someone.
   a. strongly agree.
   b. agree.
   c. slightly agree.
   d. neither agree nor disagree.
   e. slightly disagree.
   f. disagree.
   g. strongly disagree.

3. I feel capable of handling myself in most social situations.
   a. strongly agree.
   b. agree.
   c. slightly agree.
   d. neither agree nor disagree.
   e. slightly disagree.
   f. disagree.
   g. strongly disagree.

4. I don't spend much time worrying about what people think of me.
   a. strongly agree.
   b. agree.
   c. slightly agree.
   d. neither agree nor disagree.
   e. slightly disagree.
   f. disagree.
   g. strongly disagree.

---

5. In group discussions I usually feel that my opinions are inferior.
   a. strongly agree.
   b. agree.
   c. slightly agree.
   d. neither agree nor disagree.
   e. slightly disagree.
   f. disagree.
   g. strongly disagree.

6. I seldom fear my actions will cause others to have a low opinion of me.
   a. strongly agree.
   b. agree.
   c. slightly agree.
   d. neither agree nor disagree.
   e. slightly disagree.
   f. disagree.
   g. strongly disagree.

7. It doesn't bother me to have to enter a room where other people have already gathered and are talking.
   a. strongly agree.
   b. agree.
   c. slightly agree.
   d. neither agree nor disagree.
   e. slightly disagree.
   f. disagree.
   g. strongly disagree.

8. I don't make a very favorable first impression on people.
   a. strongly agree.
   b. agree.
   c. slightly agree.
   d. neither agree nor disagree.
   e. slightly disagree.
   f. disagree.
   g. strongly disagree.

9. When in a group, I very rarely express an opinion for fear of being thought ridiculous.
   a. strongly agree.
   b. agree.
   c. slightly agree.
   d. neither agree nor disagree.
   e. slightly disagree.
   f. disagree.
   g. strongly disagree.
10. When confronted by a group of strangers, my first reaction is always one of shyness and inferiority.

   a. strongly agree.
   b. agree.
   c. slightly agree.
   d. neither agree nor disagree.
   e. slightly disagree.
   f. disagree.
   g. strongly disagree.
APPENDIX B

NORMALITY TESTS

Normality tests were conducted for the arcsine transforms of the profitability scores and for the normal data and arcsine transforms of the compliance scores. The standardized third and fourth moments were computed to test for skewness and kurtosis respectively. The Kolmogorov-Smirnov goodness of fit tests for normality\(^1\) were also computed for these scores. The results of the normality tests are provided in Tables 9 and 10.\(^2\) The \(F_{\text{max}}\) statistic \(^3\) was determined to test for homogeneity of variance, although tests for homogeneity are sensitive to violations of normality. The results of the homogeneity computations are provided in Table 11.

---

\(^1\) Gibbons, Nonparametric Methods for Quantitative Analysis, pp. 56-72.

\(^2\) Significance level tables for this test were obtained from Hubert W. Lilliefors, "On the Kolmogorov-Smirnov Test for Normality with Mean and Variance Unknown," Journal of the American Statistical Association (June, 1967), 62, p. 400.

TABLE 9

TESTS FOR NORMALITY - PROFITABILITY SCORES

<table>
<thead>
<tr>
<th>Cell</th>
<th>Standard 3rd Moment</th>
<th>Standard 4th Moment</th>
<th>D&lt;sub&gt;Observed&lt;/sub&gt;</th>
<th>Level of Significance&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>.0002</td>
<td>.0001</td>
<td>.2348</td>
<td>.20 +</td>
</tr>
<tr>
<td>12</td>
<td>.0131</td>
<td>.0091</td>
<td>.2291</td>
<td>.20 +</td>
</tr>
<tr>
<td>13</td>
<td>.0096</td>
<td>.0105</td>
<td>.2157</td>
<td>.20 +</td>
</tr>
<tr>
<td>21</td>
<td>.0017</td>
<td>.0274</td>
<td>.3078</td>
<td>.10</td>
</tr>
<tr>
<td>22</td>
<td>.0109</td>
<td>.0108</td>
<td>.2823</td>
<td>.15</td>
</tr>
<tr>
<td>23</td>
<td>.0135</td>
<td>.0152</td>
<td>.2269</td>
<td>.20 +</td>
</tr>
</tbody>
</table>

<sup>a</sup> Kolmogorov-Smirnov Level of Significance for D (n=6):

<table>
<thead>
<tr>
<th>Level of Significance</th>
<th>Value of D</th>
</tr>
</thead>
<tbody>
<tr>
<td>.20</td>
<td>.265</td>
</tr>
<tr>
<td>.15</td>
<td>.277</td>
</tr>
<tr>
<td>.10</td>
<td>.294</td>
</tr>
<tr>
<td>.05</td>
<td>.319</td>
</tr>
<tr>
<td>.01</td>
<td>.364</td>
</tr>
</tbody>
</table>
### TABLE 10

TESTS FOR NORMALITY - COMPLIANCE SCORES

<table>
<thead>
<tr>
<th>Cell</th>
<th>Standard 3rd Moment</th>
<th>Standard 4th Moment</th>
<th>Observed</th>
<th>Level of Significance&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Untransformed Compliance Scores</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>.0000</td>
<td>.0000</td>
<td>.1927</td>
<td>.20 +</td>
</tr>
<tr>
<td>12</td>
<td>.0002</td>
<td>.0000</td>
<td>.2615</td>
<td>.20</td>
</tr>
<tr>
<td>13</td>
<td>.0012</td>
<td>.0005</td>
<td>.3023</td>
<td>.10</td>
</tr>
<tr>
<td>21</td>
<td>.0016</td>
<td>.0004</td>
<td>.3692</td>
<td>.01</td>
</tr>
<tr>
<td>22</td>
<td>.0004</td>
<td>.0002</td>
<td>.1986</td>
<td>.20 +</td>
</tr>
<tr>
<td>23</td>
<td>.0007</td>
<td>.0003</td>
<td>.1887</td>
<td>.20 +</td>
</tr>
<tr>
<td>(2) Arcsine Transformed Compliance Scores</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>.0001</td>
<td>.0000</td>
<td>.1927</td>
<td>.20 +</td>
</tr>
<tr>
<td>12</td>
<td>.0015</td>
<td>.0005</td>
<td>.2615</td>
<td>.20</td>
</tr>
<tr>
<td>13</td>
<td>.0124</td>
<td>.0095</td>
<td>.2995</td>
<td>.10</td>
</tr>
<tr>
<td>21</td>
<td>-.0137</td>
<td>.0074</td>
<td>.3731</td>
<td>.01</td>
</tr>
<tr>
<td>22</td>
<td>-.0048</td>
<td>.0050</td>
<td>.2105</td>
<td>.20 +</td>
</tr>
<tr>
<td>23</td>
<td>-.0034</td>
<td>.0065</td>
<td>.1818</td>
<td>.20 +</td>
</tr>
</tbody>
</table>

<sup>a</sup> Kolmogorov-Smirnov Level of Significance for D (n=6):

<table>
<thead>
<tr>
<th>Level of Significance</th>
<th>Value of D</th>
</tr>
</thead>
<tbody>
<tr>
<td>.20</td>
<td>.265</td>
</tr>
<tr>
<td>.15</td>
<td>.277</td>
</tr>
<tr>
<td>.10</td>
<td>.294</td>
</tr>
<tr>
<td>.05</td>
<td>.319</td>
</tr>
<tr>
<td>.01</td>
<td>.364</td>
</tr>
<tr>
<td>Observation</td>
<td>$F_{\text{max}}$ $^a$</td>
</tr>
<tr>
<td>-------------------------------------------------</td>
<td>----------------------</td>
</tr>
<tr>
<td>Profitability - Periods 7-9 (unadjusted)</td>
<td>40.3939$^b$</td>
</tr>
<tr>
<td>Profitability - Periods 7-9 (arcsine transformation)</td>
<td>16.6591</td>
</tr>
<tr>
<td>Compliance - Periods 7-9 (unadjusted)</td>
<td>15.9333</td>
</tr>
<tr>
<td>Compliance - Periods 7-9 (arcsine transformation)</td>
<td>17.2851</td>
</tr>
</tbody>
</table>

Significance levels:

\[ F_{\text{max}}(6,5) = 18.7 \ (\alpha = .05) \]

\[ F_{\text{max}}(6,5) = 38.0 \ (\alpha = .01) \]

$^a \ F_{\text{max}} = \frac{\text{Maximum cell sample variance}}{\text{Minimum cell sample variance}}$

$^b \text{Reject homogeneity of variance at .05 level}$
APPENDIX C

ANALYSIS OF VARIANCE IN PERIODS 7, 8 AND 9

Analysis of variance procedures, performed on untransformed profitability scores for each period seven through nine, are shown in Tables 12 through 14. The results of analysis of variance performed on arcsine transformed profitability data are shown in Tables 15 through 17. The results of analysis of variance performed on compliance data can be found in Tables 18 through 20.
TABLE 12

ANALYSIS OF VARIANCE - PROFITABILITY (Period 7)

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>35</td>
<td>.3489</td>
<td></td>
<td></td>
</tr>
<tr>
<td>α</td>
<td>1</td>
<td>.0111</td>
<td>.0111</td>
<td>1.0448</td>
</tr>
<tr>
<td>β</td>
<td>2</td>
<td>.0004</td>
<td>.0002</td>
<td>.0189</td>
</tr>
<tr>
<td>αβ</td>
<td>2</td>
<td>.0193</td>
<td>.0097</td>
<td>.9100</td>
</tr>
<tr>
<td>S/αβ</td>
<td>30</td>
<td>.3182</td>
<td>.0106</td>
<td></td>
</tr>
</tbody>
</table>
TABLE 13

ANALYSIS OF VARIANCE - PROFITABILITY (Period 8)

<table>
<thead>
<tr>
<th>Cell Means and Marginal Means</th>
<th>Cell Means</th>
<th>Marginal Means</th>
</tr>
</thead>
<tbody>
<tr>
<td>β₁</td>
<td>.9553</td>
<td>.8716</td>
</tr>
<tr>
<td>β₂</td>
<td>.8282</td>
<td>.8295</td>
</tr>
<tr>
<td>β₃</td>
<td>.8313</td>
<td>.8706</td>
</tr>
<tr>
<td>α₁</td>
<td>.7228</td>
<td>.8506</td>
</tr>
<tr>
<td>α₂</td>
<td>.8520</td>
<td>.8676</td>
</tr>
<tr>
<td>Marginal Means</td>
<td>β₃</td>
<td>μ₁</td>
</tr>
<tr>
<td>Means</td>
<td>.8391</td>
<td>.8726</td>
</tr>
<tr>
<td></td>
<td>.8401</td>
<td>.8506</td>
</tr>
<tr>
<td></td>
<td>.8726</td>
<td>.8706</td>
</tr>
<tr>
<td></td>
<td>μ₁</td>
<td>μ₂</td>
</tr>
<tr>
<td></td>
<td>.8391</td>
<td>.8401</td>
</tr>
<tr>
<td></td>
<td>.8726</td>
<td>.8706</td>
</tr>
<tr>
<td></td>
<td>μ₁</td>
<td>μ₂</td>
</tr>
<tr>
<td></td>
<td>.8391</td>
<td>.8401</td>
</tr>
<tr>
<td></td>
<td>.8726</td>
<td>.8706</td>
</tr>
</tbody>
</table>

Analysis of Variance Table

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>35</td>
<td>1.3571</td>
<td></td>
<td></td>
</tr>
<tr>
<td>α</td>
<td>1</td>
<td>.0159</td>
<td>.0159</td>
<td>.4108</td>
</tr>
<tr>
<td>β</td>
<td>2</td>
<td>.0087</td>
<td>.0044</td>
<td>.1121</td>
</tr>
<tr>
<td>αβ</td>
<td>2</td>
<td>.1683</td>
<td>.0842</td>
<td>2.1691*</td>
</tr>
<tr>
<td>S/αβ</td>
<td>30</td>
<td>1.1640</td>
<td>.0388</td>
<td></td>
</tr>
</tbody>
</table>

* Significant at .20
TABLE 14

ANALYSIS OF VARIANCE - PROFITABILITY (Period 9)

<table>
<thead>
<tr>
<th>Cell Means and Marginal Means</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\beta_1$</td>
<td>$\beta_2$</td>
<td>$\beta_3$</td>
</tr>
<tr>
<td>$\alpha_1$</td>
<td>.8980</td>
<td>.8254</td>
<td>.9055</td>
</tr>
<tr>
<td>$\mu_1$</td>
<td></td>
<td></td>
<td>.8753</td>
</tr>
<tr>
<td>$\alpha_2$</td>
<td>.7242</td>
<td>.8817</td>
<td>.9272</td>
</tr>
<tr>
<td>$\mu_2$</td>
<td></td>
<td></td>
<td>.8444</td>
</tr>
<tr>
<td>Marginal Means</td>
<td>.8111</td>
<td>.8536</td>
<td>.9164</td>
</tr>
<tr>
<td>$\mu_3$</td>
<td></td>
<td></td>
<td>.8603</td>
</tr>
</tbody>
</table>

Analysis of Variance Table

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>35</td>
<td>1.5944</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\alpha$</td>
<td>1</td>
<td>.0088</td>
<td>.0088</td>
<td>.1860</td>
</tr>
<tr>
<td>$\beta$</td>
<td>2</td>
<td>.0669</td>
<td>.0335</td>
<td>.7042</td>
</tr>
<tr>
<td>$\alpha\beta$</td>
<td>2</td>
<td>.0927</td>
<td>.0475</td>
<td>.9753</td>
</tr>
<tr>
<td>$S/\alpha\beta$</td>
<td>30</td>
<td>1.4259</td>
<td>.0475</td>
<td></td>
</tr>
</tbody>
</table>
TABLE 15

ANALYSIS OF VARIANCE - ARCSINE TRANSFORMED PROFITABILITY SCORES
(Period 7)

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>25</td>
<td>3.8973</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\alpha$</td>
<td>1</td>
<td>.1429</td>
<td>.1429</td>
<td>1.2256</td>
</tr>
<tr>
<td>$\beta$</td>
<td>2</td>
<td>.0545</td>
<td>.0273</td>
<td>.2341</td>
</tr>
<tr>
<td>$\alpha\beta$</td>
<td>2</td>
<td>.2021</td>
<td>.1011</td>
<td>.8671</td>
</tr>
<tr>
<td>S/$\alpha\beta$</td>
<td>30</td>
<td>3.4078</td>
<td>.1166</td>
<td></td>
</tr>
</tbody>
</table>

TABLE 16

ANALYSIS OF VARIANCE - ARCSINE TRANSFORMED PROFITABILITY SCORES
(Period 8)

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>25</td>
<td>11.8863</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\alpha$</td>
<td>1</td>
<td>.0576</td>
<td>.0576</td>
<td>.1730</td>
</tr>
<tr>
<td>$\beta$</td>
<td>2</td>
<td>.0753</td>
<td>.0377</td>
<td>.1132</td>
</tr>
<tr>
<td>$\alpha\beta$</td>
<td>2</td>
<td>1.7659</td>
<td>.8830</td>
<td>2.6524*</td>
</tr>
<tr>
<td>S/$\alpha\beta$</td>
<td>30</td>
<td>9.9875</td>
<td>.3329</td>
<td></td>
</tr>
</tbody>
</table>

* Significant at .10
### TABLE 17

ANALYSIS OF VARIANCE - ARC SINE TRANSFORMED PROFITABILITY SCORES
(Period 9)

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>35</td>
<td>9.6881</td>
<td></td>
<td></td>
</tr>
<tr>
<td>α</td>
<td>1</td>
<td>.0215</td>
<td>.0215</td>
<td>.0762</td>
</tr>
<tr>
<td>β</td>
<td>2</td>
<td>.5431</td>
<td>.2716</td>
<td>.9621</td>
</tr>
<tr>
<td>αβ</td>
<td>2</td>
<td>.6559</td>
<td>.3280</td>
<td>1.1619</td>
</tr>
<tr>
<td>S/αβ</td>
<td>30</td>
<td>8.4676</td>
<td>.2823</td>
<td></td>
</tr>
</tbody>
</table>
### TABLE 18

**ANALYSIS OF VARIANCE - COMPLIANCE (Period 7)**

#### Cell Means and Marginal Means

<table>
<thead>
<tr>
<th></th>
<th>$B_1$</th>
<th>$B_2$</th>
<th>$B_3$</th>
<th>Marginal Means</th>
<th>Marginal Means</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\alpha_1$</td>
<td>.4670</td>
<td>.5283</td>
<td>.5023</td>
<td>.4992 $\mu_1$</td>
<td>$\mu_1$</td>
</tr>
<tr>
<td>$\alpha_2$</td>
<td>.4711</td>
<td>.4919</td>
<td>.4981</td>
<td>.4870 $\mu_2$</td>
<td>$\mu_2$</td>
</tr>
<tr>
<td>Marginal Means</td>
<td>.4691</td>
<td>.5101</td>
<td>.5002</td>
<td>.4931 $\mu_3$</td>
<td>$\mu_3$</td>
</tr>
</tbody>
</table>

#### Analysis of Variance Table

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>25</td>
<td>.1235</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\alpha$</td>
<td>1</td>
<td>.0013</td>
<td>.0013</td>
<td>.3657</td>
</tr>
<tr>
<td>$\beta$</td>
<td>2</td>
<td>.0110</td>
<td>.0055</td>
<td>1.5236*</td>
</tr>
<tr>
<td>$\alpha\beta$</td>
<td>2</td>
<td>.0028</td>
<td>.0014</td>
<td>.3823</td>
</tr>
<tr>
<td>3/$\alpha\beta$</td>
<td>30</td>
<td>.1084</td>
<td>.0036</td>
<td></td>
</tr>
</tbody>
</table>

* Significant at .25
### TABLE 19

**ANALYSIS OF VARIANCE - COMPLIANCE (Period 8)**

<table>
<thead>
<tr>
<th></th>
<th>Cell Means</th>
<th>Marginal Means</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\beta_1$</td>
<td>$\beta_2$</td>
</tr>
<tr>
<td>$\alpha_1$</td>
<td>.3379</td>
<td>.4091</td>
</tr>
<tr>
<td>$\alpha_2$</td>
<td>.5182</td>
<td>.3109</td>
</tr>
<tr>
<td>Marginal Means</td>
<td>.4231</td>
<td>.3600</td>
</tr>
<tr>
<td>$\mu_1$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\mu_2$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\mu_3$</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Analysis of Variance Table

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>25</td>
<td>1.3864</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\alpha$</td>
<td>1</td>
<td>.0087</td>
<td>.0087</td>
<td>.2148</td>
</tr>
<tr>
<td>$\beta$</td>
<td>2</td>
<td>.0321</td>
<td>.0161</td>
<td>.3960</td>
</tr>
<tr>
<td>$\alpha\beta$</td>
<td>2</td>
<td>.1306</td>
<td>.0653</td>
<td>1.6213*</td>
</tr>
<tr>
<td>S/$\alpha\beta$</td>
<td>30</td>
<td>1.2150</td>
<td>.0405</td>
<td></td>
</tr>
</tbody>
</table>

* Significant at .25
TABLE 20

ANALYSIS OF VARIANCE - COMPLIANCE (Period 9)

<table>
<thead>
<tr>
<th>Cell Means and Marginal Means</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cell Means</strong></td>
</tr>
<tr>
<td>$\alpha_1$        $\beta_1$ $\beta_2$ $\beta_3$</td>
</tr>
<tr>
<td>0.4145            0.4920  0.3758  0.4274 $\mu_1^*$</td>
</tr>
<tr>
<td>0.5226            0.3180  0.2995  0.3800 $\mu_2^*$</td>
</tr>
<tr>
<td>Marginal Means    $\mu_{1}$ $\mu_{2}$ $\mu_{3}$</td>
</tr>
<tr>
<td>0.4686            0.4050  0.3377  0.4037 $\mu_{..}$</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Analysis of Variance Table</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source of Variance</td>
</tr>
<tr>
<td>Total</td>
</tr>
<tr>
<td>$\alpha$</td>
</tr>
<tr>
<td>$\beta$</td>
</tr>
<tr>
<td>$\alpha \beta$</td>
</tr>
<tr>
<td>S/$\alpha \beta$</td>
</tr>
</tbody>
</table>

* Significant at .25
APPENDIX D

OTHER EXPERIMENTAL RESULTS

I. Achievement Motivation and Need for Self-Esteem

It was expected that two psychological variables, achievement motivation and need for self-esteem, might intervene in the relationship between the independent variables, budget level and type of feedback, and the dependent performance variables, profitability and compliance. Specifically, it was anticipated that a subject's achievement motivation would be correlated to his performance as measured by profitability and that a subject's need for self-esteem would be related to the compliance he exhibited in the experimental task.

In order to test whether the achievement motivation-profitability and need for self-esteem--compliance relationships were exhibited by experimental subjects, the Kendall Tau coefficient was determined in each of the six experimental treatment groups for each of the two pairings of variables. The Kendall tau coefficients regarding the correlation between achievement motivation and profitability are provided in Table 21 and those between the need for self-esteem and compliance in Table 22. Only one coefficient in each of these two tables was statistically significant.
and these results could be spurious. Consequently, attempts to interpret the relationships indicated by the Kendall Tau coefficients will not be undertaken.

The lack of significance in the Kendall Tau coefficient does not imply that achievement motivation and need for self-esteem are inconsequential in performance. What it may signify is that achievement motivation and need for self-esteem did not affect performance in the current experimental task and the task failed to exploit the subjects' motivational inclinations toward achievement and self-esteem. A second explanation is that cell sizes of six subjects per cell were too small to detect such relationships. Another possible explanation is that the questionnaires used to measure achievement motivation and need for self-esteem were suspect.
### TABLE 21

**KENDALL TAU COEFFICIENT FOR PROFITABILITY AND ACHIEVEMENT MOTIVATION**

<table>
<thead>
<tr>
<th>Type of Feedback</th>
<th>Actual Results</th>
<th>Exception</th>
<th>No Feedback</th>
</tr>
</thead>
<tbody>
<tr>
<td>Budget High</td>
<td>-.276</td>
<td>.333</td>
<td>-.138</td>
</tr>
<tr>
<td>Level (Goal Low)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Difficulty</td>
<td>-.733</td>
<td>.200</td>
<td>-.333</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Experimental Treatment Group</th>
<th>Kendall Tau Coefficient</th>
<th>Level of Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>-.276</td>
<td>.720</td>
</tr>
<tr>
<td>12</td>
<td>.333</td>
<td>.470</td>
</tr>
<tr>
<td>13</td>
<td>-.138</td>
<td>1.000</td>
</tr>
<tr>
<td>21</td>
<td>-.733</td>
<td>.056</td>
</tr>
<tr>
<td>22</td>
<td>.200</td>
<td>.720</td>
</tr>
<tr>
<td>23</td>
<td>-.333</td>
<td>.470</td>
</tr>
</tbody>
</table>
TABLE 22

KENDALL TAU COEFFICIENT FOR COMPLIANCE
AND NEED FOR SELF-ESTEEM

<table>
<thead>
<tr>
<th>Type of Feedback</th>
<th>Actual Results</th>
<th>Exception</th>
<th>No Feedback</th>
</tr>
</thead>
<tbody>
<tr>
<td>Budget Level</td>
<td>High</td>
<td>.867</td>
<td>-.067</td>
</tr>
<tr>
<td>(Goal Difficulty)</td>
<td>Low</td>
<td>-.067</td>
<td>.467</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Experimental Treatment Group</th>
<th>Kendall Tau Coefficient</th>
<th>Level of Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>.867</td>
<td>.016</td>
</tr>
<tr>
<td>12</td>
<td>-.067</td>
<td>1.000</td>
</tr>
<tr>
<td>13</td>
<td>.414</td>
<td>.470</td>
</tr>
<tr>
<td>21</td>
<td>-.067</td>
<td>1.000</td>
</tr>
<tr>
<td>22</td>
<td>.467</td>
<td>.272</td>
</tr>
<tr>
<td>23</td>
<td>.414</td>
<td>.470</td>
</tr>
</tbody>
</table>
III. Post-Experimental Questionnaire Results

A post-experimental check of the subjects' perceptions of the budgets they received during the experimental session indicated that both high and low budget groups generally perceived the budgets they were assigned as high and challenging. This result may have been due to the experimental feedback conditions or to the socially acceptable wording of this alternative over the other choices of high and impossible, moderate, and relatively easy. On the other hand, the lower budgets may have been set too high in the experiment so that subjects did not perceive the difference between the two budget levels. In addition, subjects who were not receiving feedback after the third period seemed unable to evaluate their own performance, which made it difficult to evaluate the budgets accurately. A period by period examination of subjects' intentions or expectations of profit indicated that few of the subjects could accurately determine the actual profits resulting from their decisions. The subjects' perceptions of the budgets they were assigned during the experiment are summarized in Table 23. One notable finding is that subjects receiving exception feedback particularly perceived the budgets they received as being high.

A post-experimental check of the subjects' opinions regarding the usefulness of the performance reports which subjects in the two experimental feedback treatment groups received after each of the ten decision periods and which the control (no feedback) subjects received after each of the first three decision periods, did not
indicate any significant differences between treatment groups. These results are summarized in Table 24.

Evaluations by subjects of their own performance also did not indicate large differences between experimental treatment groups although more subjects receiving the lower budgets evaluated their performance as poor than did subjects receiving more difficult budgets. These evaluations are summarized in Table 25.
<table>
<thead>
<tr>
<th>Budget Level (Goal Difficulty)</th>
<th>Type of Feedback</th>
<th>Actual Results</th>
<th>Exception</th>
<th>No Feedback</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>Actual Results</td>
<td>5 - high and challenging</td>
<td>1 - high and impossible</td>
<td>1 - high and impossible</td>
<td>2 - high and impossible</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 - moderate</td>
<td>5 - high and challenging</td>
<td>2 - high and challenging</td>
<td>12 - high and challenging</td>
</tr>
<tr>
<td></td>
<td>Exception</td>
<td>6 - high and challenging</td>
<td>4 - high and challenging</td>
<td>4 - moderate</td>
<td>1 - high and impossible</td>
</tr>
<tr>
<td>Low</td>
<td></td>
<td>1 - high and impossible</td>
<td>2 - moderate</td>
<td>11 - high and challenging</td>
<td>6 - moderate</td>
</tr>
<tr>
<td>Totals</td>
<td></td>
<td>6 - high and challenging</td>
<td>11 - high and challenging</td>
<td>6 - high and challenging</td>
<td>5 - moderate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 - moderate</td>
<td>5 - moderate</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
TABLE 24

SUBJECTS' OPINIONS ON THE USEFULNESS OF THE EXPERIMENTAL REPORTS

<table>
<thead>
<tr>
<th>Type of Feedback</th>
<th>Actual Results</th>
<th>Exception</th>
<th>No Feedback</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Budget Level (Goal Difficulty)</td>
<td>2 - Useful</td>
<td>4 - Useful</td>
<td>3 - Useful</td>
<td>9 - Useful</td>
</tr>
<tr>
<td></td>
<td>4 - Not useful</td>
<td>2 - Not useful</td>
<td>3 - Not useful</td>
<td>9 - Not useful</td>
</tr>
<tr>
<td>Low Budget Level</td>
<td>3 - Useful</td>
<td>3 - Useful</td>
<td>5 - Useful</td>
<td>11 - Useful</td>
</tr>
<tr>
<td></td>
<td>3 - Not useful</td>
<td>3 - Not useful</td>
<td>1 - Not useful</td>
<td>7 - Not useful</td>
</tr>
<tr>
<td>Totals</td>
<td>5 - Useful</td>
<td>7 - Useful</td>
<td>8 - Useful</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7 - Not useful</td>
<td>5 - Not useful</td>
<td>4 - Not useful</td>
<td></td>
</tr>
</tbody>
</table>
TABLE 25

SUBJECTS' EVALUATION OF OWN PERFORMANCE

<table>
<thead>
<tr>
<th>Type of Feedback</th>
<th>Actual Results</th>
<th>Exception</th>
<th>No Feedback</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Budget Level</td>
<td>2 - Good</td>
<td>1 - Very good</td>
<td>1 - Good</td>
<td>1 - Very good</td>
</tr>
<tr>
<td></td>
<td>3 - Average</td>
<td>1 - Good</td>
<td>5 - Average</td>
<td>4 - Good</td>
</tr>
<tr>
<td></td>
<td>1 - Poor</td>
<td>3 - Average</td>
<td>11 - Average</td>
<td>11 - Average</td>
</tr>
<tr>
<td></td>
<td>1 - Good</td>
<td>2 - Good</td>
<td>2 - Good</td>
<td>5 - Good</td>
</tr>
<tr>
<td></td>
<td>3 - Average</td>
<td>2 - Average</td>
<td>2 - Average</td>
<td>7 - Average</td>
</tr>
<tr>
<td></td>
<td>2 - Poor</td>
<td>2 - Poor</td>
<td>2 - Poor</td>
<td>6 - Poor</td>
</tr>
<tr>
<td>Low Budget Level</td>
<td>3 - Good</td>
<td>1 - Very good</td>
<td>3 - Good</td>
<td>3 - Good</td>
</tr>
<tr>
<td></td>
<td>6 - Average</td>
<td>3 - Good</td>
<td>7 - Average</td>
<td>7 - Average</td>
</tr>
<tr>
<td></td>
<td>3 - Poor</td>
<td>5 - Average</td>
<td>2 - Poor</td>
<td>2 - Poor</td>
</tr>
<tr>
<td>Totals</td>
<td>3 - Poor</td>
<td>3 - Poor</td>
<td>3 - Poor</td>
<td>3 - Poor</td>
</tr>
</tbody>
</table>
APPENDIX E

PROFITABILITY AND COMPLIANCE SCORES

Profitability and compliance scores contained in Tables 26 and 27 were based on the decisions made by subjects during the experimental study. In these tables, subjects are numbered in accordance with treatment group considerations rather than by the chronological order in which they participated in the experiment. Subjects were in the following treatment groups in both tables: subjects 1 to 6 in the high budget, actual results feedback treatment group; subjects 7 to 12 in the high budget, exception feedback treatment group; subjects 13 to 18 in the high budget, no feedback treatment group; subjects 19 to 24 in the low budget, actual results feedback treatment group; subjects 25 to 30 in the low budget, exception feedback treatment group; and subjects 31 to 36 in the low budget, no feedback treatment group.
<table>
<thead>
<tr>
<th>Subject</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.3816</td>
<td>.9503</td>
<td>.7886</td>
<td>.9575</td>
<td>.9250</td>
<td>.7448</td>
<td>.9564</td>
<td>.9987</td>
<td>.7722</td>
<td>.9252</td>
</tr>
<tr>
<td>2</td>
<td>.3816</td>
<td>.9134</td>
<td>.7886</td>
<td>.6618</td>
<td>.7841</td>
<td>.7448</td>
<td>.9564</td>
<td>.9650</td>
<td>.9737</td>
<td>.9666</td>
</tr>
<tr>
<td>3</td>
<td>.3816</td>
<td>.5746</td>
<td>.0552</td>
<td>.9429</td>
<td>.9273</td>
<td>1.0000</td>
<td>.9207</td>
<td>.9663</td>
<td>.8807</td>
<td>.9833</td>
</tr>
<tr>
<td>4</td>
<td>.3816</td>
<td>.8868</td>
<td>.9353</td>
<td>.7862</td>
<td>.9977</td>
<td>.7448</td>
<td>1.0000</td>
<td>.9367</td>
<td>.9458</td>
<td>.9833</td>
</tr>
<tr>
<td>5</td>
<td>.3816</td>
<td>.9262</td>
<td>.9353</td>
<td>.6955</td>
<td>.9227</td>
<td>.3278</td>
<td>.9326</td>
<td>.8666</td>
<td>.9194</td>
<td>.8300</td>
</tr>
<tr>
<td>6</td>
<td>.5738</td>
<td>.9031</td>
<td>.9464</td>
<td>.9575</td>
<td>.8523</td>
<td>1.0000</td>
<td>.9326</td>
<td>.9987</td>
<td>.8962</td>
<td>.9833</td>
</tr>
<tr>
<td>7</td>
<td>.3816</td>
<td>.5746</td>
<td>.8991</td>
<td>.2343</td>
<td>.8409</td>
<td>.7884</td>
<td>.9049</td>
<td>.5795</td>
<td>.5320</td>
<td>.8002</td>
</tr>
<tr>
<td>8</td>
<td>.7409</td>
<td>.8834</td>
<td>.7886</td>
<td>.2343</td>
<td>.8523</td>
<td>.7448</td>
<td>.8653</td>
<td>.7561</td>
<td>.8636</td>
<td>.9190</td>
</tr>
<tr>
<td>9</td>
<td>.3816</td>
<td>.9760</td>
<td>.9401</td>
<td>.9107</td>
<td>1.0000</td>
<td>.8382</td>
<td>.9921</td>
<td>.8989</td>
<td>.8931</td>
<td>.9999</td>
</tr>
<tr>
<td>10</td>
<td>.9708</td>
<td>1.0000</td>
<td>.9353</td>
<td>.9927</td>
<td>.9295</td>
<td>.9066</td>
<td>.9921</td>
<td>.8989</td>
<td>.9194</td>
<td>.9499</td>
</tr>
<tr>
<td>11</td>
<td>.9708</td>
<td>.8834</td>
<td>.8186</td>
<td>.5725</td>
<td>.8864</td>
<td>.4896</td>
<td>.8653</td>
<td>.9367</td>
<td>.7722</td>
<td>.9793</td>
</tr>
<tr>
<td>12</td>
<td>.3816</td>
<td>.8868</td>
<td>.7886</td>
<td>.6618</td>
<td>.9932</td>
<td>.7448</td>
<td>.8653</td>
<td>.8989</td>
<td>.9721</td>
<td>.8002</td>
</tr>
<tr>
<td>13</td>
<td>.8844</td>
<td>.9463</td>
<td>.9401</td>
<td>.2343</td>
<td>.8523</td>
<td>.3278</td>
<td>.9643</td>
<td>.5795</td>
<td>1.0000</td>
<td>.8300</td>
</tr>
<tr>
<td>14</td>
<td>.3816</td>
<td>.9262</td>
<td>.8991</td>
<td>1.0000</td>
<td>.7818</td>
<td>.9751</td>
<td>.9326</td>
<td>.8275</td>
<td>.8450</td>
<td>.9044</td>
</tr>
<tr>
<td>15</td>
<td>.6908</td>
<td>.9914</td>
<td>.9464</td>
<td>.6618</td>
<td>.9273</td>
<td>.7448</td>
<td>1.0000</td>
<td>.9650</td>
<td>.9458</td>
<td>.9793</td>
</tr>
<tr>
<td>16</td>
<td>.9011</td>
<td>.8877</td>
<td>.8943</td>
<td>.9927</td>
<td>1.0000</td>
<td>.5830</td>
<td>.9921</td>
<td>.8989</td>
<td>.8931</td>
<td>.9190</td>
</tr>
<tr>
<td>17</td>
<td>.8092</td>
<td>.5746</td>
<td>.0552</td>
<td>.7350</td>
<td>.2523</td>
<td>.3278</td>
<td>.4293</td>
<td>.8181</td>
<td>.8559</td>
<td>.8763</td>
</tr>
<tr>
<td>18</td>
<td>.8983</td>
<td>.8344</td>
<td>.7886</td>
<td>.5725</td>
<td>.9409</td>
<td>.6516</td>
<td>.9921</td>
<td>.9899</td>
<td>.8931</td>
<td>.9190</td>
</tr>
<tr>
<td>19</td>
<td>.9708</td>
<td>.9760</td>
<td>.7886</td>
<td>.8653</td>
<td>.9273</td>
<td>.9378</td>
<td>.9921</td>
<td>.8989</td>
<td>.8931</td>
<td>.9252</td>
</tr>
<tr>
<td>20</td>
<td>.8008</td>
<td>.9463</td>
<td>.9464</td>
<td>.9078</td>
<td>.8523</td>
<td>.9129</td>
<td>.9868</td>
<td>.8989</td>
<td>.8931</td>
<td>.7947</td>
</tr>
<tr>
<td>21</td>
<td>.3816</td>
<td>.8448</td>
<td>.7886</td>
<td>.2343</td>
<td>.0841</td>
<td>.3278</td>
<td>.8653</td>
<td>.0000</td>
<td>.9721</td>
<td>.9545</td>
</tr>
<tr>
<td>22</td>
<td>.6114</td>
<td>.8739</td>
<td>.3375</td>
<td>.9078</td>
<td>.9273</td>
<td>.7448</td>
<td>1.0000</td>
<td>.5755</td>
<td>.5305</td>
<td>.6484</td>
</tr>
<tr>
<td>23</td>
<td>.8816</td>
<td>1.0000</td>
<td>.7886</td>
<td>.5725</td>
<td>.9273</td>
<td>.6494</td>
<td>.9208</td>
<td>.9850</td>
<td>1.0000</td>
<td>.9833</td>
</tr>
<tr>
<td>Subject</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>---------</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td>24</td>
<td>.8944</td>
<td>.5746</td>
<td>.0552</td>
<td>.9429</td>
<td>.9273</td>
<td>.3278</td>
<td>.9049</td>
<td>.9987</td>
<td>.0563</td>
<td>.9351</td>
</tr>
<tr>
<td>25</td>
<td>.9359</td>
<td>.8182</td>
<td>.8265</td>
<td>.8726</td>
<td>.5455</td>
<td>.8382</td>
<td>.8692</td>
<td>.7210</td>
<td>.7242</td>
<td>.8590</td>
</tr>
<tr>
<td>26</td>
<td>.9708</td>
<td>.9194</td>
<td>.9401</td>
<td>.9078</td>
<td>.9295</td>
<td>.8133</td>
<td>.9921</td>
<td>.9111</td>
<td>1.0000</td>
<td>.9499</td>
</tr>
<tr>
<td>27</td>
<td>.5432</td>
<td>1.0000</td>
<td>.7476</td>
<td>.8375</td>
<td>1.0000</td>
<td>.9813</td>
<td>.9921</td>
<td>1.0000</td>
<td>.9458</td>
<td>.9852</td>
</tr>
<tr>
<td>28</td>
<td>.9359</td>
<td>.9262</td>
<td>.9353</td>
<td>.6808</td>
<td>.7704</td>
<td>.3278</td>
<td>.8653</td>
<td>.5795</td>
<td>.8729</td>
<td>.8002</td>
</tr>
<tr>
<td>29</td>
<td>.8663</td>
<td>.8834</td>
<td>.9353</td>
<td>.7862</td>
<td>1.0000</td>
<td>1.0000</td>
<td>.9921</td>
<td>.9663</td>
<td>.7722</td>
<td>.9499</td>
</tr>
<tr>
<td>30</td>
<td>.8983</td>
<td>.8868</td>
<td>.3580</td>
<td>.7862</td>
<td>.9432</td>
<td>.7448</td>
<td>1.0000</td>
<td>.9340</td>
<td>.9752</td>
<td>.6600</td>
</tr>
<tr>
<td>31</td>
<td>.9359</td>
<td>1.0000</td>
<td>.9464</td>
<td>.9854</td>
<td>.9273</td>
<td>.9813</td>
<td>1.0000</td>
<td>.9340</td>
<td>.8931</td>
<td>.9499</td>
</tr>
<tr>
<td>32</td>
<td>.3816</td>
<td>.5746</td>
<td>.7886</td>
<td>.7862</td>
<td>.0000</td>
<td>.8382</td>
<td>.9921</td>
<td>.9340</td>
<td>.8931</td>
<td>.8590</td>
</tr>
<tr>
<td>33</td>
<td>.3816</td>
<td>.9194</td>
<td>.1199</td>
<td>.9356</td>
<td>1.0000</td>
<td>.9066</td>
<td>1.0000</td>
<td>1.0000</td>
<td>.9721</td>
<td>.8002</td>
</tr>
<tr>
<td>34</td>
<td>.3816</td>
<td>.9760</td>
<td>.9353</td>
<td>.9107</td>
<td>.9295</td>
<td>.8382</td>
<td>.9564</td>
<td>.9677</td>
<td>.9721</td>
<td>.9833</td>
</tr>
<tr>
<td>35</td>
<td>1.0000</td>
<td>1.0000</td>
<td>.9353</td>
<td>.9107</td>
<td>1.0000</td>
<td>.5830</td>
<td>1.0000</td>
<td>1.0000</td>
<td>1.0000</td>
<td>.9499</td>
</tr>
<tr>
<td>36</td>
<td>.9652</td>
<td>.9262</td>
<td>.7693</td>
<td>.7862</td>
<td>.4591</td>
<td>.3278</td>
<td>.9049</td>
<td>.6469</td>
<td>.8326</td>
<td>.6600</td>
</tr>
</tbody>
</table>
TABLE 27

COMPLIANCE SCORES ( \( C_{ijkt} = \frac{\text{Betasi}_{ijkt}}{\text{(Alphas + Betas)}_t} \) )

<table>
<thead>
<tr>
<th>Subject</th>
<th>Decision Period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>7</td>
</tr>
<tr>
<td>1</td>
<td>4444</td>
</tr>
<tr>
<td>2</td>
<td>4444</td>
</tr>
<tr>
<td>3</td>
<td>3714</td>
</tr>
<tr>
<td>4</td>
<td>4865</td>
</tr>
<tr>
<td>5</td>
<td>5277</td>
</tr>
<tr>
<td>6</td>
<td>5277</td>
</tr>
<tr>
<td>7</td>
<td>5714</td>
</tr>
<tr>
<td>8</td>
<td>5135</td>
</tr>
<tr>
<td>9</td>
<td>5714</td>
</tr>
<tr>
<td>10</td>
<td>4167</td>
</tr>
<tr>
<td>11</td>
<td>5277</td>
</tr>
<tr>
<td>12</td>
<td>5714</td>
</tr>
<tr>
<td>13</td>
<td>4167</td>
</tr>
<tr>
<td>14</td>
<td>5277</td>
</tr>
<tr>
<td>15</td>
<td>4865</td>
</tr>
<tr>
<td>16</td>
<td>5135</td>
</tr>
<tr>
<td>17</td>
<td>5556</td>
</tr>
<tr>
<td>18</td>
<td>5135</td>
</tr>
<tr>
<td>19</td>
<td>5135</td>
</tr>
<tr>
<td>20</td>
<td>5135</td>
</tr>
<tr>
<td>21</td>
<td>5714</td>
</tr>
<tr>
<td>22</td>
<td>4285</td>
</tr>
<tr>
<td>23</td>
<td>3714</td>
</tr>
<tr>
<td>24</td>
<td>4285</td>
</tr>
<tr>
<td>25</td>
<td>3529</td>
</tr>
<tr>
<td>26</td>
<td>5135</td>
</tr>
<tr>
<td>27</td>
<td>5135</td>
</tr>
<tr>
<td>28</td>
<td>5714</td>
</tr>
<tr>
<td>29</td>
<td>5135</td>
</tr>
<tr>
<td>30</td>
<td>4865</td>
</tr>
<tr>
<td>31</td>
<td>4865</td>
</tr>
<tr>
<td>32</td>
<td>5135</td>
</tr>
<tr>
<td>33</td>
<td>4865</td>
</tr>
<tr>
<td>34</td>
<td>4444</td>
</tr>
<tr>
<td>35</td>
<td>4865</td>
</tr>
<tr>
<td>36</td>
<td>5714</td>
</tr>
</tbody>
</table>
BIBLIOGRAPHY


