AN EXAMINATION OF THE EFFECT OF ENVIRONMENTAL CUES ON AUDIT JUDGMENTS

by

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ABSTRACT

An Examination of the Effect of Environmental Cues on Audit Judgments

A distinction may be made between two basic types of audit evidence: environmental cues and hard evidence. Environmental cues are characteristics of the client and/or engagement such as client size and industry (the setting of the audit). Hard evidence represents the data gathered from audit procedures, e.g., sample results, observation. There is widespread recognition in the literature of the apparent substantial impact of environmental cues on audit decisions, yet there have not been any direct empirical studies on the subject.

Reliance on environmental cues may lead to serious systematic judgment errors if not identified and compensated for. Research in Human Information Processing has found that decision makers appear to commonly rely on heuristic rules ("rules of thumb") in complex decision settings such as an audit. These findings suggest that auditors may be influenced by environmental biases (representativeness heuristic). To integrate the prior research and provide a framework for the study, a model of the audit decision process is presented.

This study entails a laboratory experiment in which practicing auditors are asked to reach a disclosure/

materiality decision on how to deal with a proposed audit adjustment on two actual, disguised cases. Auditors are additionally requested to indicate their perceived reliance on three other factors and explain the reason(s) for their decisions. To obtain a representative cross-section of CPAs, practitioners (n = 63) are taken from professional meetings.

Three environmental factors are manipulated in the cases: (1) client size; (2) client growth pattern; and (3) prior association. These variables are selected for the study because of their frequent mention as cues appearing to significantly influence audit decisions. The overall design is a 2 x 2 x 2 Factorial Analysis of Covariance. The covariates are various demographic data obtained from subjects. The experiment is replicated with auditing students (n = 96) to test their suitability as surrogates for practicing CPAs for the complex judgments studied.

The results indicated that environmental cues alone were not relied upon heavily enough to alter audit decisions but were found to significantly affect the perceived reliance on other vital cues. Auditors displayed proper self-insight as to the secondary impact of environmental cues. Practitioners demonstrated low consensus in judgments. CPA firm size was a strong explanatory variable. National CPAs were more risk averse

and displayed lower consensus than CPAs from local/regional firms. Auditing students were poor surrogates arriving at significantly different decisions than auditors.

The secondary influence of environmental factors found in this study bodes well for the auditing profession. The findings suggest, contrary to the contentions of critics, that CPAs can reasonably independently weigh audit evidence and are not overly influenced by environmental cues. However, guarded consultation with peers is recommended on major decisions. It is suggested that key environmental factors not be disclosed to the reviewing peer. Such controlled consultation may help insure greater objectivity and quality control.

The investigation of the impact of other environmental cues and/or exploring other audit decisions are suggested as natural extensions to this study. An examination of group decision making also appears fruitful, i.e., allow free exchange of ideas and consultation among, say, three auditors.

CHAPTER I

INTRODUCTION

This introductory chapter presents a concise outline of the purposes, major findings, and organization of the study. The topic, objective, and importance of the research is discussed first. Prior findings and current developments in auditing are then summarized, demonstrating the need for the present study. The primary research methodology employed is described. The final section of the chapter examines the major findings of the study and their implications for practice and summarizes the organization and content of the remaining chapters.

Purpose and Importance of the Study

The purpose of this study is to examine the impact of environmental factors on auditor judgments. Environmental factors are defined as characteristics of the client and/or the audit engagement such as client size, industry, length of prior association. A distinction may be made between two types of audit evidence: (1) hard evidence and (2) environmental factors. Hard evidence represents reasonably objective, unambiguous data such as

recalculation of depreciation, examination of invoices or observation. Auditing standards and procedures have traditionally dealt almost exclusively with this type of evidence. In contrast, environmental factors deal with the setting in which the audit takes place. The significance of such information is more difficult to assess and is likely to elicit lower consensus among auditors than hard evidence. For example, how should the growth trend of a firm properly affect audit programs, sample sizes, or the ultimate risk of material errors? Corless (1972) noted this distinction in audit evidence when he identified two analogous categories of evidence: sampling and non-sampling.

In recent years, there has been an increasing wave of allegations (Metcalf Report, 1977; Moss, 1976; Nader, 1976) that external auditors are strongly influenced by their relationship with the client and the nature of the audit such that they are not truly independent (e.g., a large, influential client). Auditors have the vital task of evaluating the propriety of financial information relied upon by investors, security analysts, creditors, employees, and others. Environmental factors may significantly bias auditor decision-making. The word bias is not intended to bear the negative connotation that usually is associated with it. Bias is defined by Webster's Collegiate Dictionary as "an inclination of

temperament or outlook." Such an inclination may be based on a good deal of prior evidence and experience. Consideration of environmental factors can be beneficial in alerting auditors to potential problems and providing additional information for decision-making. However, these factors may also distort the processing of audit evidence and lead to suboptimal results. Knowledge of which environmental factors substantially effect auditor judgments would afford the auditing profession the opportunity to analyze whether such biases are justified. If unwarranted, measures can be taken to compensate for these "environmental biases." As will be discussed, there has been little research in this area; this study is intended to help fill this gap.

Prior Research and Need for the Present Study

Research findings in psychology and accounting (Slovic and Lichtenstein, 1971; Libby and Lewis, 1977), in Human Information Processing (HIP) reveal that decision makers frequently arrive at judgments that seriously deviate from normative models, especially in complex, uncertain situations. Auditors commonly encounter such decision settings. The deficiencies in judgment found appear to often result from the usage of "heuristic rules" by decision makers (Tversky and Kahneman, 1974). Heuristic rules are "rules of thumb"

utilized to reduce information processing demands and can lead to suboptimal decisions. If auditors do exhibit certain heuristic rules or biases, it is vital that they be identified, evaluated, and compensated for, if necessary, in the design of audit programs.

This study will attempt to determine whether auditors display the "representativeness bias" (Tversky and Kahneman, 1974) in their decision-making process. This bias or rule is the tendency to evaluate a sample outcome by the degree to which it is similar in essential properties to a parent population. For example, if an individual likes "to work with figures and tends to be exacting," he is judged to be an accountant rather than, say, a lawyer, a professor, or a doctor. After an item is classified into a given category, judgments are made that are in accord with members of that group. For instance, auditors may view growth firms in a different light than stable or declining companies. If so, they may perceive such enterprises to be "progressive, liberal, or open." As a result, the auditor may have a less skeptical and questioning manner and fail to properly investigate for material errors or fraud. This may be referred to as the "Equity Funding Syndrome;" for such a dynamic firm as Equity Funding it was difficult to conceive of the widespread management fraud that took place. Until such time as research is conducted and evidence amassed

that strongly suggests growth firms do in fact have a lower rate of financial statement errors and frauds, such biases may be unjustified and may significantly reduce audit effectiveness.

The type of firm or engagement may affect the auditor's perceptions and subsequent judgments in reviewing the adequacy of internal control, determining sample sizes and designing audit programs for compliance and substantive testing, and in evaluating audit evidence. The primary objective of this research effort is to ascertain the extent to which auditors exhibit the representativeness bias and specifically to identify which of the environmental factors studied is most significantly relied upon in making audit judgments. As emphasized above, environmental biases may cause serious deficiencies in the design and implementation of audits.

Human Information Processing research in auditing has found that CPAs display similar capabilities and limitations in decision making as discovered in earlier HIP studies (Ashton, 1974a; Hofstedt and Hughes, 1977). Auditors also appear to employ heuristic rules, especially the representativeness bias (Uecker and Kinney, 1976; Swieringa, et al., 1976). This would lead one to anticipate that auditors may rely upon and be influenced by environmental biases or cues. However, none of the prior auditing studies directly examines the effect of

environmental factors on audit decisions. The focus of these studies is instead on hard evidence cues.

Research examining the affect of environmental variables on audit judgments is greatly needed. Many critics (Moss, 1976) argue that environmental factors may be weighed as heavily or more heavily by auditors than hard evidence in reaching audit decisions. Yet, there is only limited empirical research addressing whether and which environmental cues are significantly relied upon by auditors. The loss of confidence by many in the ability of auditors to objectively and effectively examine evidence has been prompted by past serious abuses in accounting practices, a rash of notorious bankruptcies and management frauds, and the discovery of the practice by major corporations of remitting illegal payments to foreign officials (Forbes, March 15, 1977). A few of the major scandals were: Penn Central, National Student Marketing, Equity Funding, and Stirling Homex. The common question raised is: "Where were the auditors?" The implication and tone of the Metcalf Committee Report probably would answer: "They were influenced by the relationship with the client and looked the other way." However, whether in fact, auditors are generally affected by these environmental factors is an empirical question this study will address.

In recent years CPA firms have been especially concerned about quality control in auditing and the potential loss of faith by the public in the auditors' opinion. Substantial court awards against CPA's has prompted this concern, e.g., the largest judgment against an auditing firm in a single case, $30 million, was just decided in November 1977 for alledged misrepresentations in the financial statements of U.S. Financial Corporation, audited by Touche, Ross & Company. Additionally, the threat of government intervention in establishing and monitoring accounting and auditing standards is present. The recommendations of several congressional committees, especially the "Metcalf Committee Report," have concluded that such intervention is necessary. The Securities and Exchange Commission has also become more involved in the accounting standards formulation and enforcement process.

In answer to congressional actions and public concern, the American Institute of Certified Public Accountants (AICPA) formed the Commission on Auditors' Responsibilities (CAR) to "consider how well independent auditors <u>are meeting their present responsibilities</u>, whether their responsibilities should be changed, and how the nature and limitations of those responsibilities can best be communicated to users of the auditors' work" (CAR, 1974, p. 4). The Commission's study, originally intended to take one year, was completed after three

years of data collection, hearings, and deliberations. The amount of effort expended and the attention paid to this study illustrates the auditing profession's concern over quality control and the auditors' societal role.

A review of the professional literature indicates widespread recognition of the apparent substantial impact of environmental factors on audit decisions (Arens and Loebbecke, 1976; Metcalf Report, 1977). Additionally, the literature regarding materiality judgments is examined as an example of a high level, subjective audit decision. Again, several sources assert that environmental cues are significantly relied upon in such decisions (Financial Accounting Standards Board, 1975b; Pattillo, 1976).

Thus, environmental factors are alleged by many to be heavily considered by auditors, yet there has not been any empirical studies directly examining this issue. As indicated earlier, environmental biases may lead to significant decision errors, and, therefore, it is important that such biases, if any, be identified and evaluated. Audit programs and staff training may then be altered, if necessary, to compensate for such factors.

Research Methodology

This research effort entails a laboratory experiment in which practicing auditors are asked to reach a

decision on how to deal with a proposed audit adjustment. Subjects are taken from professional meetings to obtain a representative crossection of CPA's from various firms and to acquire practitioners at the higher staff levels. Individuals at these higher levels are the ones that make the complex audit judgments examined in this study. To insure the desired level of realism and complexity the decision settings utilized are two actual, disguised cases. Both cases involve difficult, controversial accounting issues. Auditors are additionally requested to indicate the importance of a number of factors to their judgment and to explain how the final decision was reached. Various demographical data are also solicited (e.g., professional experience, staff level). The environmental factors manipulated in each case are:

(1) length of association with the client,

(2) client size, and

(3) growth pattern of the firm.

These variables were selected for study because they frequently are mentioned by critics of the auditing profession who argue that these environmental factors may significantly affect the objectivity of auditors (Metcalf Report, 1977; Dixon, 1977; Benis and Johnson, 1973).

The background variables are examined in an attempt to explain anticipated significant individual

differences among auditor's judgments. For example, level of professional experience may be an important intervening variable as to the effect of environmental factors on audit decisions. It is hypothesized that there is a positive relationship between experience level and the amount of reliance on environmental cues. Demographic variables have frequently been posited in the professional literature as variables influencing audit judgments.

Auditors are asked to indicate the reasoning they used to reach a given decision. This may provide insight into the conscious factors considered and into the thought process. Such information can indicate the degree of self-insight possessed by auditors in their respective decision rules as to the importance of environmental factors. The decision process is also of significance. If environmental biases are found to result in judgment errors, it is vital to determine how this process can be altered to compensate for such problems.

The basic research design employed is the post-test- only, control group approach (Campbell and Stanley, 1963). This design offers the advantages of strong internal validity and greater time efficiency. The statistical approaches used are Analysis of Variance (ANOVA) and Analysis of Covariance. The covariates are the demographic factors solicited from subjects and serve essentially the same purpose as a pretest. The

overall design is, thus, a 2x2x2 Factorial ANOVA; the factors are the environmental cues to be studied.

The final phase of the research is a replication of the basic experiment using auditing students as subjects. Student responses are then compared with those of auditors in an attempt to discover the suitability of students as surrogates for practicing auditors. There is a greater availability of students as subjects as compared to auditors, both in terms of numbers and time per respondent. However, this advantage must be weighed against the potential loss in external validity caused by employing student surrogates in place of CPAs. The replication of the experiment provides evidence to evaluate the extent of this loss of external validity. These findings are expected to shed light on the validity of prior auditing research utilizing students as subjects and to serve as a cost/benefit guide for future research.

Major Findings and Implications

The most significant finding was that environmental cues alone were not relied upon heavily enough to substantially affect audit judgments. Environmental factors, however, were found to significantly alter the reliance on hard evidence cues. These results suggest environmental data may be important "secondary" factors in the decision process. The impact of the environmental

cues on the weighting of hard evidence varied for each case and, thus, appears to be situation specific.

This major finding as to the apparent limited influence of environmental factors implies that auditors can independently weigh audit evidence and therefore, governmental control over the auditing profession, as proposed recently, appears unnecessary. The secondary impact of environmental cues does, however, suggest that the profession must take steps to prevent unwarranted biases. Guarded consultation of peers, partner rotation on engagements, and peer review by other firms may be effective means to minimize such biases on audit decisions.

Certified Public Accountants demonstrated low consensus. Practitioners from national firms generally revealed lower consensus and were more conservative than local/regional CPAs. Such poor consensus among auditors presents great problems over quality control. Greater guidelines appear necessary for practitioners to deal with the difficult decisions investigated in this study.

Students were found to reach decisions that were significantly different than their real world counterparts. Students also displayed generally lower consensus than auditors. These results suggest that students, even those that are accounting majors and have been exposed to an auditing course, as in this study, are poor

surrogates for practitioners in difficult, complex audit decision settings.

Overview of Chapters

The study begins with a review of the prior research in this area in Chapter II. The research is evaluated; a void is identified that justifies the importance of this research effort. Specifically, although there are numerous a priori statements asserting that auditor judgments are influenced by environmental variables, there is little direct empirical research on the subject.

Chapter III presents a theoretical model of the audit decision process and hypotheses are derived as to the importance of environmental factors in this process. Several key experimental hypotheses to be tested in this study are introduced.

The research methodology is presented in Chapter IV. After evaluating alternative approaches in testing the research hypotheses in this study, the laboratory experiment appears to be the most appropriate research method. The nature of the test instrument is described and a research design presented. Independent variables are then defined, followed by a justification of the selection of the particular variables selected for

study. The Chapter is concluded with a discussion of the statistical tests employed.

The results of the study are outlined and analyzed in Chapter V. Major findings are highlighted and briefly discussed.

The results of the research and their implications for the auditing profession are discussed in the final Chapter VI. The methodological limitations of the study are identified along with a summary of measures taken to minimize these limitations. Finally, avenues for future research are explored.

CHAPTER II

REVIEW OF THE LITERATURE AND JUSTIFICATION FOR STUDY

This chapter reviews and analyzes prior research addressing the central research issue, i.e., the impact of environmental factors on audit decisions. An audit involves examining voluminous data and arriving at an overall assessment as to the "fairness" of financial statements. Auditors must make complex decisions under uncertainty. Audit decisions involve, explicitly or implicitly, probability assessments such as the probability that a material error can occur given the internal control system or the probability that audit tests will fail to discover a material error. Can auditors correctly process the extensive, complex data compiled in an audit? The first part of this chapter examines research in psychology and accounting in Human Information Processing (HIP). This research emphasizes the study of individual capabilities and the cues and decision rules used in arriving at judgments under uncertainty. Such research provides valuable findings suggesting problems auditors may face in processing information, thus, shedding light on the issue considered in this study.

Research specifically involving auditing tasks or auditors is then reviewed to ascertain whether auditors appear to have the same information processing limitations possessed by decision makers in general. A look into the professional literature reveals widespread recognition of the apparent significant reliance on environmental cues by auditors. The last section of the chapter provides an overall analysis of the adequacy of prior research in addressing this research issue at hand. The need for the present study is then justified.

HIP Research in Psychology and Accounting

There has been extensive research, primarily in psychology, dealing with man's information processing abilities under uncertainty. This chapter presents the significant findings of such research,[1] divided into four major areas:

(1) man's intuitive comprehension of basic statistical concepts;

(2) subjective probability revision as compared to the normative Bayes' Theorem;

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[1]For more detailed reviews see:

Psychological Research: Slovic and Lichtenstein (1971); Lee (1971); Becker and McClintock (1967); Raport and Wallsten (1972); Slovic, Fischhoff and Lichtenstein (1977). Accounting Research: Libby and Lewis (1977); Chesley (1975); Driscoll and Mock (1976); American Accounting Association (1977).

(3) modelling of decision processes (Lens Model): and

(4) cognitive style.

Man's Intuitive Comprehension of Statistical Concepts

Early HIP research examined the individual's ability to understand fundamental statistical properties such as means and variances, probability distributions, and independence. Several of the significant findings suggest that decision makers:

(1) do not properly consider the significance of sample size (Tversky and Kahneman, 1971). Even research psychologists were found to have substantial difficulties despite their strong background in statistics;

(2) can be reasonably accurate in estimating means but frequently underestimate variances and confidence intervals (Beach and Swenson, 1966; Spencer, 1963; Hofstatter, 1939; Beach and Scopp, 1968; Alpert and Raiffa, 1969).

(3) have difficulty in comprehending the concept of statistical independence (Cohen and Hansel, 1955; Wagenaar, 1970; 1972; and Simon and Sumner, 1968); and

(4) have a preference for symmetrical probability distributions (Cohen and Hansel, 1955).

The above findings suggest that auditors must beware of overreliance on small sample sizes and of establishing confidence intervals that are too narrow such that the probability that a value (e.g., account balance) lies outside of the interval is more than desired. Auditors should, thus, consult established statistical tables or formulae when designing or interpreting the results of audit samples.

Subjective Probability Revision

The research examining subjective probability revision is founded on the perceived sequential nature of information processing. Such research is valuable in indicating the relative impact of various cues and in judging the optimality of decisions by comparing actual decisions to the normative statistical model of Bayes' Theorem. The majority of these studies conclude that humans tend to make decisions that basically conform to Bayes' Theorem but are overly conservative, in that judgments exhibit lower variability and greater reluctance in assessing extreme values than is justified by the data. "Anything that interferes with subjects' understanding of the task, their willingness to give unbiased answers, their ability to do the appropriate mental or intuitive

mathematics, etc., will tend to yield results that can be labeled conservative" (Beach, Wise and Barclay, 1970, p. 182).

More recent studies involving relatively complex tasks in which cues are neither reliable nor independent reveal that humans appear to have severe information processing difficulties. In a study by Kahneman and Tversky (1972) subjects relied on sample proportion in assessing subjective probabilities and essentially ignored prior probabilities. They concluded: "in his evaluation of evidence, man is apparently not a conservative Bayesian: he is not Bayesian at all" (p. 450). Hogarth (1975) asserts that humans are selective, sequential information processors with limited capacity and, thus, are poorly equipped to assess probability distributions. Based on an extensive review of the literature, Slovic and Lichtenstein (November 1971) conclude that:

> . . .the intuitive statistician appears to be quite confused by the conceptual demands of probablistic inference tasks. He seems capable of little more than revising his response in the right direction upon receipt of a new item of information. . .after that, the success he obtains may be purely a matter of coincidence--a fortuitous interaction between the optimal strategy and whatever simple rule he arrives at in his groping attempts to ease cognitive strain and to pull a number "out of the air" (p. 714).

Tversky and Kahneman (1972, 1973, 1974) have conducted extensive research on HIP capabilities; their findings indicated subjects:

(1) failed to properly incorporate prior probabilities;

(2) overly relied on sample proportion;

(3) did not appropriately consider the impact of sample size; and

(4) placed greater confidence in their predictions when they knew the variables are correlated. Yet the statistics of correlation indicate that the accuracy of projections based on independent variables is higher.

Beach, Wise, and Barclay (March 1970) discovered a similar reliance of subjects on sample proportion.

> The estimates are more similar to the proportion than they are to the Bayesian values in not just their 'conservative' magnitude but also in the pattern of their distributions. Clearly, proportion accounts for the subjects' estimates better than probability does (p. 186).

The response mode, reward structure, and order, variability and amount of data have been demonstrated to substantially affect judgment (Hogarth, 1975). Increases in the amount of information presented appears to reduce subject consistency. Vital cues are relied upon more heavily as variability increases.

There are only a small number of accounting studies examining subjective probability revisions in an accounting context. Libby and Lewis (1977, p. 257) state:

> In the Bayesian framework, there are many potential variables amenable to study and only a few accounting studies. Thus no general conclusions concerning information processing behavior are apparent in the accounting literature.

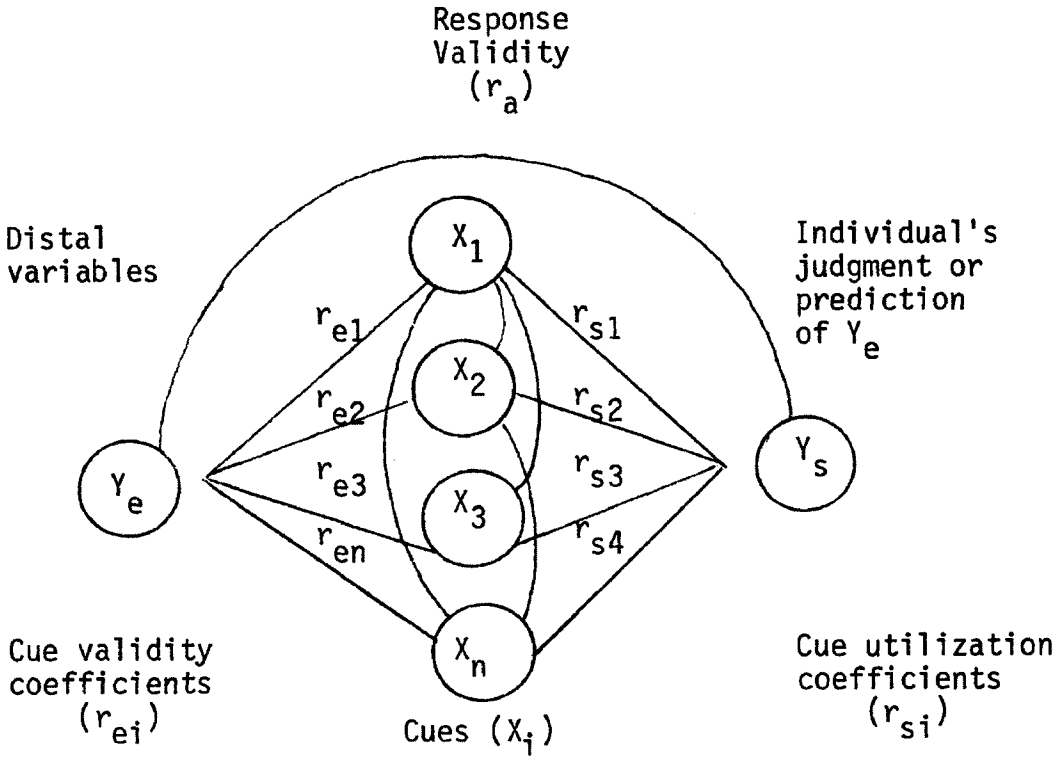
The knowledge that decision makers often have severe limitations in arriving at appropriate judgments has important implications to auditors. Significant deviations from optimality were especially found to occur in complex decision settings (Kahneman and Tversky, 1972), the situation frequently encountered by auditors. These findings provide added impetus for empirical research in auditing oriented towards the identification of auditor HIP limitations and the development of strategies to correct for such deficiencies.

Modelling of Decision Process (Lens Model Approach)

The Brunswik Lens Model (Brunswik, 1952; 1956), provides a valuable theoretical setting to examine the relationships between cues, judgments, and the environment under conditions of uncertainty. The model is presented in Figure 1. Relationships between the variables in the model are usually expressed as correlation coefficients. Cue validity (r_{ei}) indicates the accuracy of the cues in representing the state(s) of the environment. Cue utilization (r_{si}) refers to the extent to which the decision maker uses the cues in making judgments. Response validity (r_a) indicates the relative

FIGURE 1

THE BRUNSWIK LENS MODEL



Source: Ashton (1974a: p. 722)

accuracy of the individual in predicting the environment. The Lens Model is a descriptive approach of decision making as compared to the normative model with subjective probability revision (Bayes' approach). Judgments have been typically modelled via multiple regression or discriminant analysis, where cues are continuous, and ANOVA where cues are categorical (nominal).

Some of the major findings of the numerous research studies in psychology employing the Lens Model approach are:

(1) judgments are best predicted by simple linear models (Goldberg, 1968; Simon and Newell, 1970);

(2) judgment accuracy is poor, despite the amount of cues given or the training and experience of the individual (Goldberg, 1968).

(3) decision-makers demonstrate poor self-insight of the weighting placed on various cues employed. There is a tendency to over-estimate the reliance on less important cues and underestimate usage of vital cues (Hoffman, 1960);

(4) consensus among judges is low (Goldberg, 1968);

(5) consistency of judgments over time is reasonably good (Goldberg, 1968);

(6) judgments often are significantly affected by the amount of information ("information overload" may set in) cue intercorrelations and feedback (Slovic and Lichtenstein, 1971); and

(7) models of an individual's judgment process are more accurate than the decision maker himself (Dawes and Corrigan, 1974). This finding has led many researchers to suggest constructing a model and replacing the decision maker with his model, referred to as "boot-strapping."

Libby and Lewis (1977), in reviewing accounting research employing the Lens Model framework, conclude that the findings generally confirm those discovered in the psychological research except for greater degrees of consensus and self-insight than previously encountered:

> Numerous generalizations can be made from these results related to information processing issues and accounting policy issues. As in previous information processing studies, with few exceptions, seemingly complex human decision processes can be accurately predicted and cue usage estimated from simple linear models . . . Their responses are, for the most part, highly consistent over time. Differing levels of consensus have been reported which may be related to subject sophistication and commonality of experience. While normal biases in self-insight were generally reported, some groups of subjects produced extremely high levels.

> These same subjects also produce the highest degree of consensus. It seems that well-defined tasks with well-defined criteria performed by highly trained subjects produce the greatest consensus and self-insight (p. 254).

The findings of the studies set in an auditing context are discussed in the next section of this chapter. An important implication of the accounting research in this area is that auditors, as highly trained individuals, may not possess information processing weaknesses of decision makers in general, such as poor self-insight and low consensus.

Cognitive Style

Cognitive style refers to information processing characteristics of individual decision makers. The attempt in this line of research is to identify basic categories of users so that the amount and type of information supplied can be tailored to the needs of the individual. The two major constructs in this area that have received the widest attention in the accounting research are (Libby and Lewis, 1977; American Accounting Association, 1978):

(1) Decision style; and

(2) Decision approach.

Decision style refers to differences in the amount of information used and focus of decision makers. Figure 2 identifies the four types of decision styles

FIGURE 2

DECISION STYLE

Degree of Focus in Use of Data	Minimal (Satisficer)	Maximum
Multiple Solutions	Flexible	Integrative
One Solution	Decisive	Hierarchic

Amount of Information Used

Source: Driver and Mock (1975, p. 497).

enumerated in the literature. Decision approach refers to the mode of decision making of an individual. Two basic approaches are noted: heuristic, trial and error satisficing behavior; and analytic, logical, mathematical mode seeking optimization (Vasarhelyi, 1977; Huysman, 1970). The decision style and approach constructs sprang largely from findings of earlier research in psychology indicating that subjects used and had preferences for different amounts of information (Shroder, Driver and Streufert, 1967; Warr, 1970; Driver and Lintott, 1973).

The research on cognitive style may be of great importance to CPAs if it is discovered that auditors tend to have a certain information processing characteristic in general or at specific staff levels. For example, perhaps the vast majority of auditors have an Integrative decision style (Driver and Mock, 1975). If this were the case, research findings may shed valuable light on the optimum type and quantity of evidence that should be gathered and processing weaknesses to be aware of.

Unfortunately the research findings in accounting in this area have been conflicting and ambiguous. A major problem appears to be that an instrument does not presently exist to appropriately classify individuals as to cognitive style according to the theoretical concepts expounded (measurement errors). An example of the conflicting evidence is that Mock et al (1972)

discovered performance to be significantly related to decision approach, while in a later experiment Mock and Vasarhelyi (1976) found no such relationship. One common finding, however, is that the use and perceived need for different types and quantities of information appears to be related to cognitive style (Libby and Lewis, 1977). A review of the research in this area led Libby and Lewis to conclude: "If we are to tailor information systems to classes of users, it is clear that more definitive results are required" (p. 263).

Heuristic Rules

The psychological research on subjective probability revision, reviewed earlier, revealed that humans arrive at decisions that seriously depart from formal normative statistical models in certain situations. In an attempt to explain these findings Tversky and Kahneman (1974) posit that individuals resort to certain heuristic rules or biases ("rules of thumb") in order to reduce the strain of information processing in complex circumstances. These biases may be a set of rules that are distinct from statistical models and do not necessarily lead to incorrect judgments (significant departures from normative models). In most cases the use of heuristic rules is anticipated to result in reasonably appropriate decisions, and, in fact, decision making in

a very complex setting may not be possible without such biases. However, heuristic rules may also lead to serious systematic errors, which, if not identified, would result in incorrect information processing. If an individual is unaware of the use of such inappropriate rules, errors would continue to occur. Thus, it is important to discover and evaluate the heuristic rules employed.

Tversky and Kahneman (1974) identify three heuristic rules that are consistent with prior research findings in psychology:

> (1) representativeness, the degree to which an event is judged to belong to a population on the basis of how similar the event resembles perceptions of the population, e.g., a large, burly man may be viewed as more likely to be a truck driver than an averaged sized man, simply because many expect a truck driver to be large from past impressions, images:
>
> (2) availability, the tendency to arrive at probabilities based on the ease of recalling a given event; and
>
> (3) anchoring and adjustment, arriving at an initial decision and subsequently using that point as a benchmark to judge future similar situations.

Tversky and Kahneman noted that each of these heuristic rules can lead to serious biases and resultant errors in information processing. Several possible "biases," systematic errors, are identified with each of the three heuristic rules noted.

Representativeness may lead to:

(1) Improper consideration of prior probabilities. Subjects have been found to overly rely on the representativeness of new evidence even if this evidence is worthless, and disregard their prior subjective probabilities;

(2) Lack of appreciation for the impact of sample size. Individuals appear to rely on sample proportion and are insensitive to sample size. Judgments are made on how well sample proportion corresponds with the population considered;

(3) Misperceptions of chance. Subjects have been found to expect a boy will be born after a family has had three girls; yet, the probability of a boy is still .50 (independent events). These misperceptions have lead decision makers to overly rely on results of small samples and over-estimate the replicability of such results;

(4) Lack of appreciation for the reliability of data. Individuals tend to make judgments according to the representativeness of data without considering the source of the information.

(5) The illusion of validity. Respondents indicate higher confidence in their judgments when the information received is highly representative of a population and the evidence is not contradictory. They often appear to discount conflicting results. The statistics of correlation indicate, however, that judgments are subject to greater accuracy if based on pieces of independent data; and

(6) Misconceptions of regression. The appearance of extreme values in a process tends to be followed by movements towards the mean. Thus, very high sales in a given year would be expected to drop in the next period, unless the entire process has shifted. Humans do not appear to visualize regression in situations where it is highly probable. When this process is recognized, often erroneous reasons are advanced to support the movement.

The heuristic rule of availability has been demonstrated to result in the following information processing errors:

(1) Assessing higher probabilities for events most easily recalled. Events that have had a

strong impression on an individual are judged to be more likely than faintly remembered occurrences. Thus, the probability of death due to breast cancer may be assumed to be higher by many than by fire due to the recent attention paid to this disease in the press. Yet the chances of death by fire are quite a bit higher than by breast cancer;

(2) Underestimation of the probability of events that are difficult to search for in ones memory;

(3) Underestimation of the probability of occurrences that are difficult to imagine; and

(4) Illusory correlation. This is the tendency to judge the likelihood of the co-occurrence of two events based upon one's memory and beliefs as to how they appear to be related ("correlated"). People appear to focus on certain perceived instances of association and ignore others (Chapman and Chapman, 1967; 1969). In other words, individuals see data relationships they expect to see.

The bias of illusory correlation has important relevance to this study on the impact of environmental factors on audit judgments. An audit is a complex

decision making process. It is very difficult to identify all of the systematic processing errors that may occur during an audit or to associate a discovered judgment error with one particular bias. The representativeness bias is closely related to the concept of illusory correlation. Thus, if auditors, for example, tend to apply more liberal standards to large firms, this could result because firms are expected to have fewer material errors and audit adjustments. In this study, such a bias is viewed as more closely akin to the use of the representativeness heuristic rule. However, one can certainly conclude that such a bias is evidence of illusory correlation. Such a fine distinction is not significant. There are ample research findings suggesting both biases are common among decision makers in general such that a priori hypotheses as to their use by auditors can be justified for the present study. The important issue is to identify environmental biases, if any, employed by auditors. How one labels such biases in terms of earlier research findings is relatively unimportant.

Finally, Tversky and Kahneman (1974) suggest the following errors may occur as a result of the use of the anchoring and adjustment heuristic rule:

(1) Insufficient revision of subjective probabilities. The "conservatism" commonly discovered in psychological research may result

from anchoring; people are reluctant to significantly revise their judgments once an anchor or benchmark is established.

(2) Overestimation of the probability of conjunctive events and underestimation of disjunctive events. Conjunctive events are those involving a series of occurrences, e.g., picking four spades in a row from a deck of cards. Disjunctive events are those requiring at least one event to occur in a series, e.g., selecting one or more spades in four cards; and

(3) Anchoring in the assessment of subjective probability distributions. Once an anchor is established, individuals have been discovered to set a probability distribution around this mean. This leads often to variances that are too narrow.

Tversky and Kahneman (1974) note that the heuristic rules and corresponding errors advanced are consistent with and help explain the findings of prior research discovering deviations from normative statistical models by humans. They do not imply that the three heuristic rules hypothesized are the only ones in practice. There may exist numerous heuristic biases employed by individuals which future research will uncover.

Driscoll and Mock (1976) present a summary of the HIP research findings in psychology and accounting, discussed in this section, as to the limitations of humans to process information. These limitations "...fit into six main categories which are":

> 1. The problems the HIP's has when attempting to be an intuitive statistician.
>
> 2. The limitations of the HIP's information volume handling capabilities ("information overload").
>
> 3. The strategies used by the HIP to compensate for limited information handling capabilities (heuristic biases).
>
> 4. The general lack of convergence between 'optimal' and actual judgments made by the HIP [i.e., lack of consensus among judges, conservatism and little convergence (decision dependent on the set of information received)].
>
> 5. The lack of HIP insight into their own judgmental strategies.
>
> 6. The emotional need of the HIP to see more information that is actually required to make judgments (p. 34). (Items in parenthesis were added.)

Two common criticisms levied at the HIP research studies discussed thus far are: (1) the decision context is typically a highly artificial laboratory situation; and (2) the requested response made is often explicit probability judgments rather than decisions subjects are accustomed to making. Interestingly, studies by Swieringa et al (1976) and Murphy and Winkler (1974), employing MBA students and meterologists, respectively, report subjects arrived at reasonably accurate statistical

judgments, when faced with a familiar decision task. For example, Swiering et al (1976) discovered that a change in context of a problem can significantly alter intuitive judgments; they refer to this as "situational sensitivity." Additionally, their findings suggest that the familiarity of the subject with the situation affects his decisions.

> Thus, whether a manager is likely to use this heuristic (of representativeness) in evaluating the chances that a process is in or out of control may depend on whether the manager has in mind well-defined models of in and out of control processes and whether observed outcomes are highly representative of the essential features of these models (p. 34).

These findings have important implications for auditors, who have highly specialized training. Perhaps auditors do not exhibit the same HIP weaknesses characteristic of general decision makers. Only empirical research, employing auditors in familiar, realistic settings, can provide insight into this question. Therefore, there is a need for HIP research in auditing in order to discover the capabilities of auditors to make complex decisions under uncertainty. HIP limitations may lead to serious deficiencies in the quality of audit work. HIP research in auditing can evaluate information processing difficulties of auditors, if any, so that they may be identified and compensated for, if possible, during the conduct of the audit. The next part of this chapter will review prior HIP research in auditing.

HIP Research Involving Auditors And/Or Audit Decisions

HIP research in auditing has received wide attention in recent years, yet there are only a limited number of published studies at this time. One can expect to see a proliferation of such studies in the accounting literature over the next few years. The major auditing studies will be reviewed followed by a summary of the predominant findings.[2]

Review of HIP Auditing Studies

Ashton (1974a) conducted a study involving 63 CPAs requested to evaluate the internal control of a payroll system for a hypothetical firm from 5 internal control cues. Auditors demonstrated high consistency and, contrary to the predominant findings of prior research, high consensus (mean r = .7) among themselves. ANOVA was employed to estimate the effect of the various cues upon the judgments. Consistent with prior studies, auditors displayed a linear decision rule, relying most heavily on the cue of "separation of duties." Auditors also exhibited good self-insight of their decision rule. This

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[2]For a thorough review and a taxonomy of auditing research, see Lin, Mock, Newton, Vasarhelyi (1978).

study is noteworthy in that auditors demonstrated fewer HIPS weaknesses than suggested by other studies.

Joyce (1976) examined the decisions of 35 auditors regarding the amount of time to budget audit work in five categories relating to accounts receivable. The time allocation decision was to be based on five internal control and related accounting cues received. Multiple Analysis of Variance and Analysis of Variance were used. The results are similar to the predominant findings of prior HIP research studies:

(1) linear decision rule;

(2) high predictability of individual judgments;

(3) strong consistency;

(4) consensus and self-insight low; and

(5) the "separation of duties" cue was relied upon most heavily.

Hofstedt and Hughes (1977) attempted to determine the cues relied upon and the form of the auditor's materiality decision. The subjects were 19 MBA students, serving as surrogates for practicing auditors. Students were asked to indicate the probability of disclosing losses from the write-off of an unconsolidated subsidiary as an extraordinary item. The "size" of the loss was reported as a percentage of: (1) operating income; (2) all investments in unconsolidated subsidiaries; and (3) net book value of the subsidiary being written off.

These cue measures (percentages) were varied from "low" to "high" levels. The results indicated that subjects had a highly linear decision rule, relying most significantly on the "percentage of net income" cue. Consensus was low, and predictability of individual decisions high.

Boatsman and Robertson (1974) employed discriminant analysis to study the materiality judgments of 18 CPA s and 15 security analysts. Subjects were asked to indicate how an item should be disclosed in the financial statements: none, footnote, line-item. Each subject received 30 hypothetical cases; eight factors were presented in each situation. An aggregate model predicted 63% of the disclosure decisions and 84% of all disclose/no-disclose judgments. The "percentage of net income" cue accounted for 73% of the explanatory power of the model. An important finding was that there was no significant difference between auditors' and analysts' decisions.

One hundred and twelve CPA s participated in an experiment conducted by Uecker and Kinney (1976). Subjects were presented five audit cases describing sample outcomes from a test of transactions. Each case revealed two sample results; subjects selected the outcome which they perceived as better evidence that the true population error rate was less than 5%. Three of the pairs of results were designed to test for the existence of the representativeness bias, two tested for the

"protectiveness heuristic," i.e., the auditor, wishing to minimize legal risk and exposure, selects the items which maximize the dollar value audited. The findings revealed a preference for large samples (conservatism) and an insensitivity to the role of sample size (representativeness heuristic). Auditors "outperformed subjects in similar experimental tasks . . . responding correctly 69.1% of the time" (p. 10).

However, 75% of the CPA s made one error and 56% two or more. The heuristic bias of representativeness was more predominate than protectiveness; 54% committed at least one error of representativeness as compared to 37% of protectiveness. The number of years of experience had no significant correlation with the number of correct responses.

Swieringa et al (1976) examined judgments on internal control. Questionnaires were submitted to 60 MBA students. Subjects were provided brief descriptions of two companies along with the prior probability for a firm having excellent internal control. The descriptions were general and were designed to be of little value in analyzing internal control. Respondents were asked to indicate the probability that each of the firms described had excellent internal control. The results revealed that subjects had essentially ignored the descriptions and arrived at subjective probabilities that approximated the

prior probabilities. Thus, they appeared to be capable information processors with reference to the Bayesian framework, since the later data (descriptions) did not contain additional information to justify revising the prior probabilities. A similar experiment (i.e., relating to the subjective probability that an individual engaged in a specified profession) yielded approximately the same results. Of the two tests, subjects relied less on company descriptions and more on personal narratives. It should be recognized that the subjects were MBA students in auditing and cost accounting courses. Thus, it is not evident what proportion of the subjects had been exposed to auditing problems.

Swieringa et al also conducted a series of experiments to examine the strength and validity of the heuristic rule of representativeness. Several of the aforementioned experiments performed by Tversky and Kahneman were replicated and/or modified; additionally a few situations were framed in a business context, e.g., the judgment on internal control referred to earlier. A notable difference between the studies is that Tversky and Kahneman employed subjects having little knowledge or education in statistics (high school students and liberal arts undergraduates) whereas the former study included students who had an exposure to this discipline

(students in the MBA program and enrolled in statistics or management courses).

The results of the study by Swiering et al suggest:

(1) Contrary to Tversky and Kahneman's findings, prior probabilities were appropriately incorporated;

(2) Subjects failed to correctly appreciate the impact of sample size;

(3) Judgments were not dominated by sample proportion irrespective of sample size; and

(4) Confidence in predictions are greater for variables perceived as correlated. However, consistency in the data (less variability) and not correlation among the variables tends to account for greater confidence.

Swieringa et al discovered that the phrasing of the question and the context had a significant effect on the decisions of the respondents.

Corless (1972) provided 88 CPA s with two cases of hypothetical payroll systems. Subjects were asked to indicate the error rate based on the case description only (prior probability) and then later on sample results (posterior probability). One of the cases reflected stronger internal control than the other. Sample sizes were manipulated at 200, 50, or 20, and the sample error rate was varied: "high" (20%); "medium" (10%); or "low" (0%). Finally, various demographic questions were asked about the professional experience and statistical background of the subject.

The results revealed a willingness of auditors to specify prior probabilities. There was substantial

variability in the prior probabilities indicated for each case even though all auditors received identical facts on each. One fourth of the cases demonstrated inconsistent prior probabilities among auditors. Bayesian revised probabilities were generally lower than the subjective posterior probabilities. Auditors failed to properly appreciate sample size and, thus, demonstrated the usual "conservatism" in probability revision. As the sample error rate increased, the deviations of judgments as compared to the normative Bayes' revision became substantially greater; this implies that prior probabilities are essentially ignored in such cases.

Prior probabilities were lower in cases where there was evidence of stronger internal control, as expected. Also the variation in prior probabilities was lower where greater control existed. Auditors indicating their clients typically have stronger internal control than in the case situation arrived at prior probabilities that concentrated on lower expected error rates than auditors whose clients have weaker internal control. Thus, the type of client (strength of internal control) commonly encountered by the auditor appears to affect prior probabilities. However, differences in audit experience and statistical training were not significantly related to the assessment of prior probabilities.

Newton (1977) hypothesized that materiality judgments are related to the uncertainty of the item in question and the auditor's risk propensity. To test this hypothesis nineteen audit partners were asked to complete three cases:

(1) a standard gamble situation. This case was employed to measure the subject's general risk attitude (risk neutral, risk seeker, risk averse);

(2) the proposed writedown of marketable securities due to a "permanent" decline in value; and

(3) the disclosure of a contingent liability relating to a lawsuit.

The latter two cases represent audit materiality decision settings encountered in practice. In each case the auditor indicated the amount of the write-down or damages that would be considered material. Subjects then stipulated the minimum probability that the event (permanent decline in value of securities and loss of lawsuit) would occur which would cause them to consider the item material. This minimum probability was determined alternately given three values for the item, e.g. the current value of marketable securities was set at $5 million, $10 million, and $17.5 million. A final question asked whether the CPA would accept the item as

material given a stipulated amount and probability of occurrence; this question endeavored to determine whether the subject was consistent in a given case when the structure of the question was altered. Utility curves for each subject were plotted on each case.

The majority of auditors (55%) were found to be risk averse on the auditing cases while 34% were risk seekers. Subjects displayed consistent risk preferences within the auditing cases and generally across all cases. The major finding was that the judgments of respondents supported the central hypothesis, i.e., materiality decisions are based on the uncertainty of an issue and the auditor's risk attitude.

Moriarity and Barron (1976) use conjoint measurement methods to examine the form of the auditor's materiality decision model and the scaling of selected cues. Fifteen audit partners were asked to rank the relative materiality of an item (substantially higher depreciation due to a revision in the estimated life of an asset) to eighteen firms. Each firm represented a manipulation of three cues (net income, size of company, and earnings trend) on a basic set of financial statements.

Eight of the fifteen subjects demonstrated additive decision models, while three others displayed a nearly additive model. Only four appeared to have configural decision rules. The scaling of the cues varied

significantly. There was a strong consensus that effect on net income was the most important cue. However, auditors disagreed on the relative importance and interpretation of the other two cues. "Two participants . . .placed virtually no weight on either the trend variable or size variable. This suggests that auditors not only disagree on the form of decision models, but further do not even agree as to which variables should have an effect on materiality decisions" (p. 337).

Weber (1978) examined the accuracy, consensus, and decision confidence of forty auditors in evaluating the possible dollar error of a hypothetical inventory internal control system. The experimental group was provided access to an interactive simulation decision aid, allowing auditors to conduct sensitivity analysis to predict the impact of different error rates on the financial statements. The control group did not have such access. The decision aid is hypothesized to lead to greater decision accuracy, consensus, and confidence than the traditional, subjective approach. At an interim date CPAs were asked to estimate dollar errors in the internal control system and required audit-time for substantive tests. Subjects were later requested to revise such estimates based on the actual sample results of the inventory count.

The findings indicate that the simulation decision aid did result in higher accuracy and confidence and lower decision time, as hypothesized. However, the estimated required audit time was not significantly different among the experimental groups. All auditors were relatively accurate in their estimates of the mean but demonstrated poor consensus as to the range. The control group seriously underestimated the actual range of dollar errors. Practitioners failed to properly revise estimates of audit time and dollar errors as a result of sample results. In fact, the planning of substantive testing audit time was relatively insensitive to such evidence. Consensus as to dollar errors was poor.

These results suggest decision aids may be of value in evaluating internal control. Auditors appear to have difficulties in assessing the range of errors and have serious problems in adjusting substantive testing plans to reflect their assessment of the internal control system. The low level of consensus is of special concern:

> ...two auditors may differ substantially in their decisions on the magnitude of error sensitivity and the direction of the dollar error which can result. My perception of the levels of anxiety resulting when subject auditors made this decision further suggests they are not trained to make this decision, or if they are trained, they are not trained effectively (Weber, 1978, p. 385).

Mock and Turner (1978), as Weber, were concerned about the ability of auditors to revise substantive tests as a result of reliance on internal controls. Practicing auditors were asked to adjust the initial planned sample size for four audit procedures after receiving information of changes in the internal controls from the previous year. Half of the subjects were provided data indicating a marked improvement in controls (E1) while the remaining half obtained scenarios of only a slight strengthening of controls (E2). The empirical question was whether the former group (E1), having knowledge of substantial improvements, would reduce sample sizes more than the E2 group. Such a reduction would indicate a proper adjustment of substantive tests in view of greater reliance on internal controls.

Contrary to the findings of Weber, Mock and Turner found auditors did properly adjust sample sizes (substantive tests). Although consensus as to the proper extent of tests was very poor, especially for the E2 group.

The researchers also investigated for the existence of anchoring and halo biases. The halo effect is when the decision maker is influenced by prior findings on similar issues. Anchoring was defined earlier (Tversky and Kahneman, 1974). To test for the halo effect, in one

area controls were not improved from the prior year for both experimental groups. The results indicated all subjects reduced sample size in this area even though controls did not change. Reductions were greatest for the E1 group (strong improvements in controls). Evidently general improvements on all the other controls influenced the substantive testing decision, demonstrating the presence of the halo bias.

To test anchoring, a separate control group was asked to perform the experiment but was not provided information on the planned sample size. Thus, these auditors could not be influenced by prior judgments. This group received evidence only of marked improvements in internal controls. The control group arrived at sample sizes that were significantly larger than the experimental group (E1) on all but one of the audit procedures. This finding indicates that anchoring did appear to occur.

Mock and Turner also attempted to determine the impact of training on audit decisions. Half of the subjects of both experimental groups were provided guidance as to the relationship between the reliance on internal controls and the scope of substantive tests. The other half received no guidance. The decisions as to sample sizes were not significantly different between the guidance and no guidance groups. Evidently far more

detailed training is required to have a substantial affect on audit decisions.

Summary of HIPS Research in Auditing

The two auditing decisions receiving the greatest empirical attention are the evaluation of internal control and the determination of materiality. The extent of "segregation of duties" and the "percentage of net income" appear to be the most important cues relied upon in internal control and materiality judgments respectively. Practitioners appeared to have difficulties in evaluating internal controls and integrating this evaluation with the determination of the scope of later substantive tests (Weber, 1978; Mock and Turner, 1978).

Auditors displayed the usual HIP capabilities/limitations, except for the Ashton (1974a) study, encountered in earlier research:

(1) low consensus;
(2) distorted self-insight into their decision rule, although better than most subjects;
(3) decision rules which could be modeled as linear and additive;
(4) high predictability of judgments;
(5) "conservatism" in probability revisions;
(6) little convergence; and
(7) consistency in judgments.

Newton (1977) discovered that auditors are generally risk averse and weigh the uncertainty of an item along with individual risk preference in making materiality decisions.

Two studies (Uecker and Kinney, 1976; Swieringa et al, 1976), employing a Bayesian framework, attempted to evaluate the degree of optimality of auditor judgments. Both studies found the auditor to make decisions closer to "optimal," using probability theory as a benchmark, than other subjects in similar experiments. The amount of training of the subject and the context of the decision appear to significantly affect performance.

Additionally, auditors appeared to utilize heuristic rules, especially the representativeness heuristic, and displayed the biases of halo and anchoring (Mock and Turner, 1978; Uecker and Kinney, 1976). These results are significant since, as noted earlier, the psychological research also suggested the widespread use of heuristic rules by decision makers. This finding also leads one to hypothesize that auditors may be influenced by environmental factors (the central research question in this study), because auditors bring with them on any engagement their prior knowledge of the client such as the industry, background of management, and past problems and their professional training and experiences. The professional literature will now be examined for

evidence of recognition by auditors and other interested parties of the apparent impact of environmental factors on audit judgments as encountered in practice.

Recognition of the Potential Effect of Environmental Factors on Audit Decisions

There is frequent mention in the auditing literature of the common reliance on environmental information for several decisions, e.g., planning, designing audit tests. Peat, Marwick, Mitchell & Co., CPA's, in a recent publication entitled Research Opportunities in Auditing (1976), outline the phases of an audit engagement. An integral part of the first phase, "Initial Planning," involves an assessment of the "Auditors' prior knowledge of industry and client" (p. 21). There is only vague mention of how this information is integrated in the planning stage. However, there is recognition that such environmental data is considered extensively by the auditor. In addition, virtually all current auditing textbooks discuss the incorporation of environmental data in the audit process. For instance, Arens and Loebbecke in Auditing An Integrated Approach (1976) devote an entire chapter to these factors, entitled "Understanding the Client and Its Business." The authors state: "The careful review and examination of certain types of general information are useful in

predicting the likelihood of errors in different audit areas and evaluating whether sufficient evidence has been accumulated. Detailed tests can then be modified to provide assurance of the discovery of all material errors" (p. 119). Thus, consideration of environmental factors (formally or informally) appears to a common procedure in the audit process.

There has been much discussion in the professional literature on procedures auditors may undertake to minimize the exposure of legal liability to third parties. Frequently it is asserted that environmental factors do in practice detrimentally affect audit judgments. Chazen and Solomon (1975) state:

> Despite his long-standing relationship with the client, despite the atmosphere of friendliness in which he operates, despite the fact that he is economically dependent on his client's audit fees, the auditor must train himself to operate as though he were in clinical surroundings; this way his judgments will be more meaningful and more defensible (p. 70).

Chazen and Soloman argue that auditors must protect themselves against legal liability by being alert to problems, curious, skeptical, and inquisitive. Audit work should be carefully documented. Chazen and Soloman imply that reliance on certain environmental factors can, on the other hand, be beneficial in alerting the auditor to potential problems. "In order to detect these signals and ultimately pursue them, the auditor must know his client, his client's business and related

activities, his client's history and background" (p. 69). The major assumption here is that the auditor has the necessary capabilities to appropriately process such information.

The Metcalf Report alleged that the environmental factors of: (1) size of the client, and, therefore, the resulting audit fee; and (2) term of association reduce the independence of the auditor and accordingly lead to substandard performance. An article in Management Accounting (April 1977) quotes the Metcalf Report: "Long association between a corporation and an accounting firm may lead to such close identification of the accounting firm with the interests of its client's management that truly independent action by the accounting firm becomes difficult" (p. 53).

A summary statement of the findings of the Metcalf Report (November 1977) issued to the Committee on Governmental Affairs stated:

> In our judgment the fundamental problem is one of independence, which is clearly the auditor's single most valuable attribute. If the accountant approaches the audit with a predisposition--whether conscious or otherwise--to validate management's work rather than to subject it to careful scrutiny, then the ultimate result will be a diminution of public confidence in the profession and in business generally; correspondingly, the very substantial sums which our economy channels to the accounting professional will be in large measure wasted.

Four of the 12 recommendations of the Metcalf Report, entitled "The Accounting Establishment," appear to be

aimed specifically at mitigating perceived environmental biases; these recommendations were:

(1) mandatory change of accountants after a given period of years;

(2) periodic inspection of the work of independent auditors by a designated governmental agency;

(3) prohibition of management advisory services which might impair an auditor's independence; and

(4) action by the federal government to relieve excessive concentration in the supply of auditing and accounting services to major corporations.

The matter of independence was also aired by Harold Williams, the current chairman of the SEC, as he discussed the problems facing the auditing profession. "The issues, as I see them, are three: independence, the accounting and auditing standard setting process, and quality control, including self-discipline. The issue of independence, I suspect, is the key one" (1977, p. 17).

Several other groups have questioned the performance of auditors. Ralph Naders' Corporate Accountability Research Group (1976) issued a report recommending the federal chartering of corporations; it also strongly suggested that auditors be rotated every five years. Representative John Moss, as Chairman of the House Subcommittee on Oversight and Investigation, has been highly critical of the auditing profession in meeting its responsibilities of discovering and reporting on corporate illegal payments. The Subcommittee's report

(1976) recommended laws prohibiting such actions and federal overview of auditing practice. Moss (April 1978) indicated that as a result of findings in continued hearings of the Subcommittee he planned on introducing legislation to regulate the auditing profession. He also has called for uniform accounting standards in the oil and gas and health care industries to correct abuses and the alleged failure of the profession to provide appropriate accounting guidelines for comparability in these industries.

The charges of critics discussed above explicitly assume that due to influence from clients auditors are not able to objectively weigh audit evidence and, thus, effectively perform their primary societal role. This assumption is based on the occurrence of a relatively small number of highly publicized major bankruptcies and frauds in recent years in which the proper performance of the auditors on the engagement was in question. The logic supporting the allegations appears to be: if there are improprieties, then CPAs must not be capable of properly conducting audits. Therefore, government regulation or takeover is needed. However, perhaps the scandals that occurred represented only rare cases of incompetent or misguided practitioners. All professions inevitably possess members that despite strong quality control measures perform poorly. Is it accurate

to extrapolate from a few cases of impropriety to say that the entire profession is incapable? Only empirical evidence from a representative sample of practitioners can properly address the question of widespread needs for reform. This study attempts to gather such evidence to assess the influence of environmental cues on audit decisions.

Due to the pressures for reform exerted by Congress and other influential bodies, the AICPA Council approved a plan in September 1977 involving several significant measures. CPA firms will be divided into two divisions: SEC Practice Firms Section and the Private Companies Practice Section. Only members of the former group will be allowed to perform audits on publicly-traded corporations. Bylaws of the SEC Practice Firms Section require mandatory peer reviews, rotation of audit partners, sanctions of firms, and "cold reviews" of audit work (review by an auditor unassociated with the engagement) (Journal of Accountancy, October 1977). These measures seek to minimize environmental and other biases that may exist and, thus, to strengthen the independence in fact and in appearance of auditors.

The Materiality Decision

Several complex subjective decisions are made during an audit which may be significantly affected by

environmental data, e.g., evaluation of internal control, type of opinion, disclosures, planning of audit time. One such decision requiring professional judgment is materiality. The professional literature and several research studies on materiality are now examined to provide an example of an audit judgment where the impact of environmental factors is frequently noted. Also the decision to present a limited review of the literature on materiality is especially pertinent to this study, since, as will be discussed in Chapter IV, the experiment requires subjects to arrive at a materiality/reporting decision.

In March 1975 the Financial Accounting Standards Board issued a 246 page discussion memorandum, "Criteria for Determining Materiality," in which several factors that are used in assessing materiality were listed:

(1) Environmental factors;

(2) Enterprise related factors;

(3) Accounting policies;

(4) Uncertainty;

(5) Circumstances surrounding a matter and its characteristics;

(6) Magnitude and financial effect; and

(7) Cumulative financial effect.

In an overview of the memorandum, Van Arsdell (October 1975) discusses the first of the two factors noted.

> Accordingly, preparers and auditors consider the economic, business and political environments . . . Numerous enterprise related factors influence the form and content of financial statements and, hence, materiality decisions. Among these are an enterprise's management, characteristics (e.g., high risk, cyclical), nature of operations, ownership interest and public image (p. 74).

Woolsey (March 1973a) argues for the establishment of quantitative criteria for the determination of materiality, e.g., 8 - 11% of average net income. Two or three "rules" could be arrived at and used in judging materiality; if any were violated, an item would be deemed material. Woolsey believes the criteria should be in the form of a range (6 - 9% of owners' equity) and should be adjusted in "sensitive cases," e.g., if an error would cause earnings per share to deviate from a 3 - 4 year trend, the criteria would be lowered. These sensitive cases essentially involve the consideration of environmental factors in arriving at a decision.

Woolsey (September 1973b) sent case situations to users and preparers of financial statements (CPAs, controllers, security analysts, and accounting educators) in which subjects were asked to decide whether an error was material and indicate the reasons for their conclusion. One hundred seventy-six responses were received. The major factor considered was the percentage of the item to net income. However, there was considerable disagreement as to the level in which an error is considered

material. All subjects stated there are sensitive situations where the general criteria should be altered, e.g., changes in an earnings trend. Respondents did feel that the criteria should be uniformly applied to items whether the effect is to increase or decrease income.

Pattillo (July 1974) argues that no one criterion should be utilized solely in determining materiality; several financially and nonfinancially related quantitative and qualitative factors must be considered. A few of the qualitative factors mentioned that exhibit the impact of environmental variables on the materiality decision are:

> The item's general and relative effect upon the overall appearance of the financial statements or related disclosures. The item's relationship to the feeling by some information providers that the information 'just needs to be disclosed.' Peculiar characteristics of the firm or industry or both (P. 41).

Pattillo conducted a survey soliciting the perceptions of 104 preparers and users of financial information as to what factors are considered in assessing materiality. The overall consensus of responses support Pattillo's basic contention that there are several factors utilized in materiality decisions. Contrary to the findings of Woolsey (September 1973) subjects indicated that materiality criteria vary for "favorable" versus "unfavorable" errors.

Patillo later conducted an extremely comprehensive study (1976) involving approximately 700 participants (users and preparers) sponsored by the Financial Executives Research Foundation. Subjects were provided several realistic cases and asked to stipulate at what magnitude the discovered error would be considered material and the factors considered in their decision. Several commonly used criteria were listed, e.g., nature of the item, dollar amount, etc. Seven different types of errors appeared.

Three significant findings were:

> (1) An overall materiality judgment criterion in the form of a single dollar amount or percentage relationship is not appropriate for all situations. The so-called rule-of-thumb criterion of 5%-10% of net income is frequently used with, or is sometimes replaced by, other quantitative and non-quantitative materiality judgment criteria (p. 1).
>
> (2) Materiality criteria varied widely among subjects with greater consensus among preparers than users. CPA's were the most conservative in setting criteria; and
>
> (3) The nature of the error affected the materiality threshold.

A major assumption of the Woolsey and Pattillo studies cited is that individuals know the factors they employ in arriving at materiality determinations. As noted earlier in this paper, several empirical research efforts in psychology and accounting have discovered that subjects possess poor self-insight into the cues used in decision-making. Therefore, this assumption of the

Woolsey and Pattillo surveys may be invalid and, thus, the findings are suspect.

Frishkoff (1970) attempts to model the materiality decisions of auditors using multiple discriminant analysis. The dependent variable is the nature of the audit opinion, qualified or unqualified, given a change in accounting methods, i.e., violation of consistency. Out of 2,218 annual reports examined for the year ended 1963, 190 involved consistency issues and had sufficient data to be included in the final sample. Seventeen independent variables were placed in the discriminant equation, four of which were environmental data:

(1) size of CPA firm;

(2) size of company (shareholders' equity);

(3) whether the firm experienced a profit or loss for fiscal 1963; and

(4) if the CPA firm was a member of the "Big Eight."

Three variables were significant ($\alpha \leq .10$);

(1) percentage effect of the accounting change on income;

(2) size of the company; and

(3) whether the change was one of reclassification, e.g., switch from the equity method to consolidation of subsidaries. Such changes have no net effect on income.

The significance of percentage impact on income was expected, since this cue has been widely found to be relied on in materiality judgments. Setting more liberal materiality criteria for reclassification changes was also anticipated. The effect of size of company suggests the impact of an environmental factor; the variable of client size is also examined in this research study (see description of independent variables in Chapter IV).

Surprisingly with the effect on income as the only variable in the discriminant model the dividing line between qualified and unqualified opinions was set at changes representing 25% of income, much higher than the earlier literature. When comparing the model to actual audit opinions, 55% of the opinions were incorrectly classified, i.e., deviated from the model. Also if the only cue used was the effect on income "there was in practice no discernible or even remotely uniform notion of materiality" (p. 125). Only 29% of the opinions were incorrectly classified with all three significant variables incorporated in the model. Frishkoff concludes:

> Although the discriminant functions which are an output of this analysis may at first appear complicated, the heuristic which they imply is really quite simple: Give a qualified opinion to all changes except for reclassifications and for very large firms. Thus, the larger the net worth of the firm, the less likely it was to receive a qualified opinion, and for firms of net worth of $150 million or more, even a 30% change in net income resulted in only a 50% chance ex post of receiving a qualified opinion; for a small firm, the probability was about 60% (p. 126).

Stringer (1970) critiqued Frishkoff's study. He noted that the finding of a mean materiality threshold of 25% of income in the model does not appear reasonable. Manipulating the data, he discovered that if 5% of income were the criterion the number of apparent "incorrect" opinions would be minimized to 25%; this criterion is consistent with most findings of prior survey research. Using 5% of income as the materiality guideline, it is discovered that large firms were not favored as suggested by the results presented by Frishkoff. In fact, 28% of the smaller companies incorrectly received unqualified opinions while only 9% of the larger firms received such favorable treatment. Of course, a major assumption by Stringer is that the materiality threshold used by auditors in practice is 5% of income. As noted earlier, this assumption minimizes the incidence of incorrect opinions, and, thus, somewhat begs the question, i.e., auditors are explicitly assumed to make few judgment errors.

Summary of the Professional Literature and Studies on Materiality Examined

There is common mention in auditing texts and the professional literature of the usage of environmental cues to forewarn the auditor of potential risks and problems that may be encountered and as a benchmark for decision making. Several governmental bodies have been concerned with the influence of environmental factors on

audit decisions (Metcalf Report, SEC, etc.) and the accounting standards formulation process. Legislation to oversee the auditing profession has been proposed. The AICPA has responded by enacting significant reforms in an attempt to alleviate the concerns of these bodies and of many auditors themselves who have long perceived quality control problems in practice.

Materiality was selected as an example of a subjective audit decision that was also especially relevant to this study. Literature on materiality frequently notes the importance of environmental factors as apparent cues for this decision. In summary, the various sources cited in this section demonstrate the widespread recognition in practice of the impact of environmental factors on audit judgments.

Analysis of Prior Research and Justification for Study

The findings of several HIP studies reviewed in psychology and accounting suggest the common usage of heuristic rules by humans. The HIP research in auditing indicates CPA's appear to have information processing limitations that are similar to other decision makers as discovered in earlier HIP studies and also resort to heuristic biases to reduce the difficulty of making judgments in complex settings. However, the published research in auditing is limited at this time and, thus,

such conclusions are somewhat premature. These results suggest that auditors may rely on environmental biases (heuristic rules) to arrive at difficult decisions. The widespread recognition in the professional literature of the usage of environmental factors provides further a priori support for this hypothesis.

None of the prior HIP studies directly investigates the effect of environmental factors on audit decisions. These studies predominantly focus on which of the "hard evidence" cues are utilized by auditors, e.g., Joyce (1976) and Ashton (1974a) examine the usage of internal control factors (separation of duties, etc.); Hofstedt and Hughes (1977) and Boatsman and Robertson (1974) attempt to model the materiality decision, no environmental data are introduced.

The materiality studies by Pattillo (1976) and Frishkoff (1970) do examine the effect of environmental factors on this audit judgment. Pattillo incorporates several environmental variables such as firm size into his study; however, the data were obtained through a survey. Since several research studies, many of which have been noted earlier in this paper, suggest that decision-makers have little self-insight into their individual decision rule, the results may not indicate the actual effect of environmental factors on judgments and are, thus, suspect. Frishkoff discovered a significant relationship between

client size and the audit opinion where a change in accounting methods occurred (consistency issue). Stringer (1970) questioned these results. Frishkoff also warns of placing substantial reliance on these findings due to the small sample size of large firms (16) and the ex post nature of the study. This latter shortcoming of this study is significant. Examining the opinions of many firms ex post introduces several potential intervening variables that can significantly influence the results and are not controlled for or known such as client industry, reputation, or growth pattern.

There have not been any controlled experimental studies investigating the impact of environmental factors on audit judgments, yet several individuals and groups have stated (e.g., Metcalf Report) that such cues appear to be relied upon very heavily by auditors and in some cases over-ride sampling, "hard" evidence. As discussed earlier, the reliance on environmental cues may lead to serious systematic judgment errors. It is, thus, crucial to identify which environmental factors, if any, are used by auditors in decision making and evaluate the propriety of such usage. Errors resulting from environmental biases may then be compensated for by revising audit procedures.

The findings may greatly aid CPA firms in designing audit programs to maintain high quality control.

This topic is of such concern that Peat, Marwick, Mitchell & Co., CPA s (1976) listed the "Measurement of Unintentional Auditor (Human) Error" as one of 49 pressing research opportunities in Auditing. Additionally, nine other research areas were identified as being directly related to this topic:

(1) Effectiveness of Auditing Procedures;

(2) Audit Programming - Conceptual Framework;

(3) Weighing of Audit Evidence;

(4) Engagement Review;

(5) Firm Level Quality Control - Measurement of Audit Effectiveness;

(6) Auditor Liability;

(7) Personnel - Measurement of Auditor Integrity;

(8) Personnel - Measurement of Auditor Competence; and

(9) Professional Development and Continuing Educational Requirements.

These findings may be of great help to auditing firms in designing training programs to make CPA s aware of such biases and take appropriate audit steps to mitigate their effect. This study is, thus, needed to gather evidence in a largely unexplored, significant area of auditing. The research is expected to provide insight and guidance to the auditing profession and direction for future research.

CHAPTER III

MODEL OF THE AUDIT DECISION PROCESS AND HYPOTHESES OF THE RESEARCH STUDY

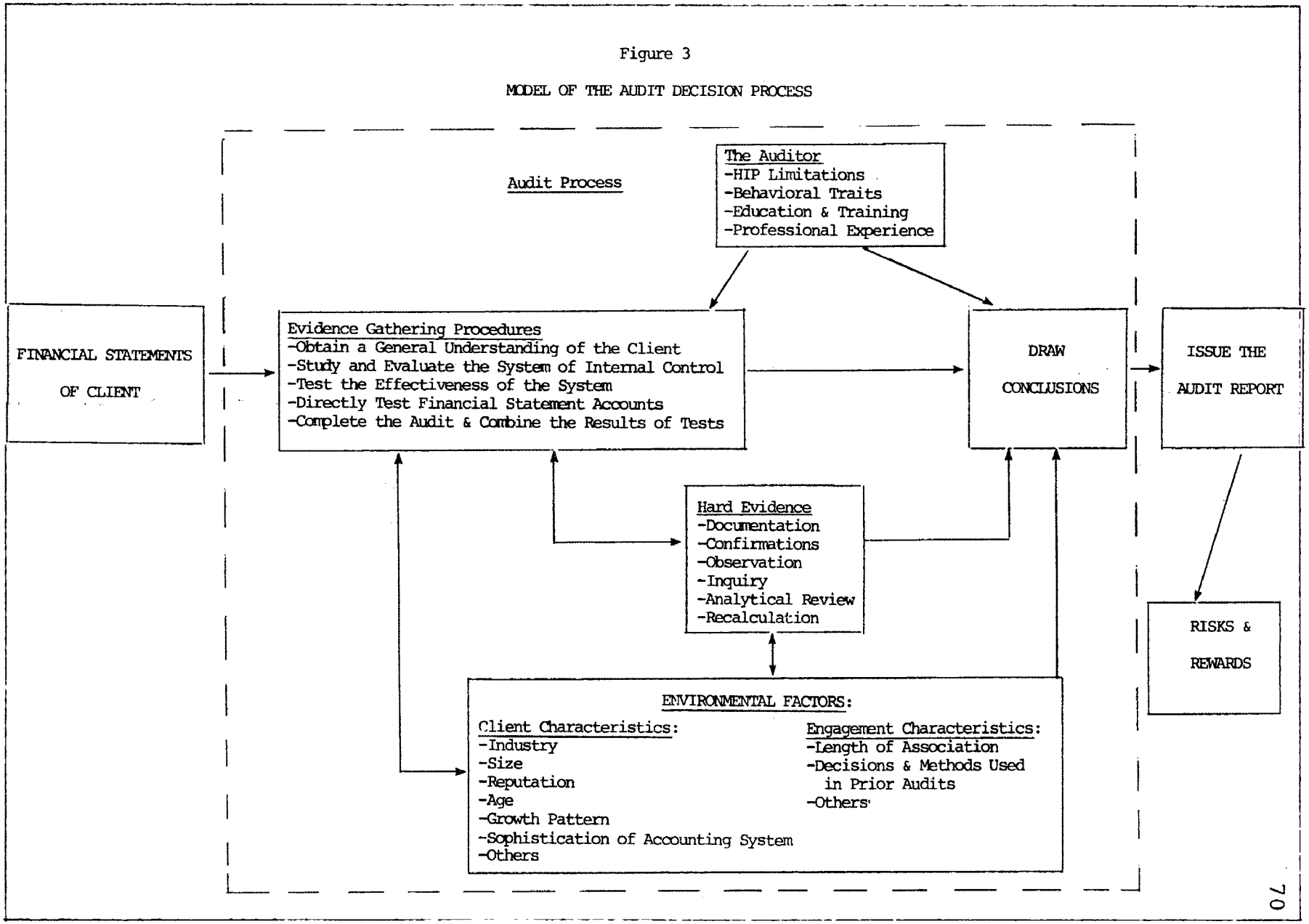
A model of the audit decision process is now presented in an attempt to integrate the prior research findings, as discussed in the previous chapter, and serve as a framework for the present study. The constructs and relationships between these constructs are defined and examined. The key relationships to this study are identified. The last section of the chapter posits several research hypotheses to be tested. These hypotheses are an outgrowth of the implications of the model and results of previous research in this area.

Model of the Audit Decision Process

Figure 3 presents a theoretical model of the audit decision process. This process is viewed as essentially an evidence gathering procedure (information system) undertaken by auditors in order to attest to the "fairness" of the client's financial statements in presenting the economic status and performance of the firm. The model is patterned after the Information Economics (I/E) Model (Feltham, 1972; Mock and Vasarhelyi,

Figure 3

MODEL OF THE AUDIT DECISION PROCESS

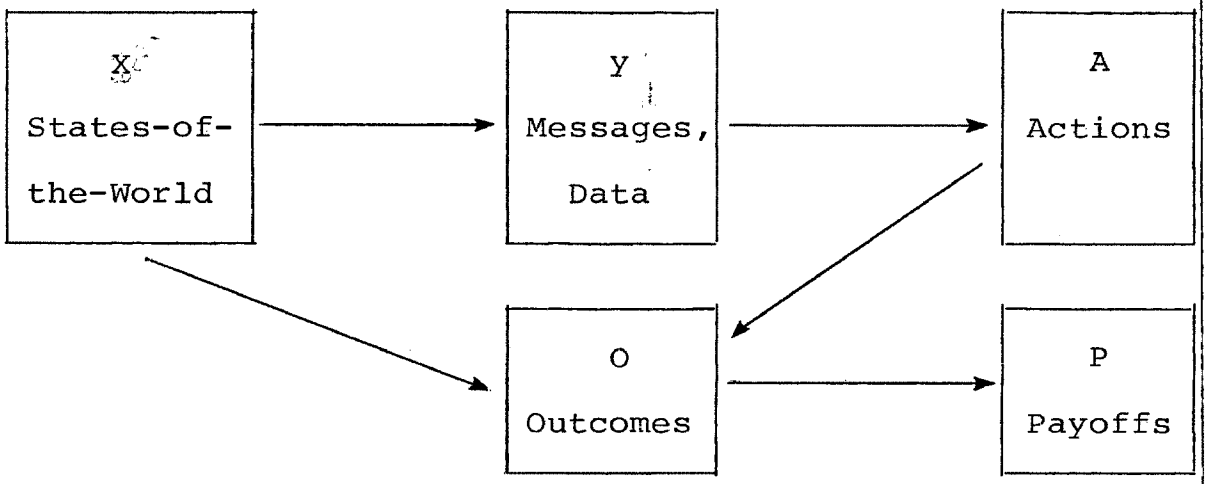


1978) used to normatively evaluate alternative information systems in terms of their net expected utility. A simplified version of the I/E Model is presented in Figure 4. This model depicts an "input, process, output" sequence. The input to the information system are signals or messages, the process is arriving at a decision and taking a particular course of action, and the output is the outcome and resulting payoffs of the action taken.

The model presented here also reveals an analagous "input, process, output" series. The financial statements of the client represent the "input" to the model. These statements are purported by management to properly present the economic status of the firm. The "process" component of the model entails the audit procedures taken to gather evidence as to the propriety of the financial statements, the information, thus, accumulated (hard evidence and environmental factors), and the final conclusions. These conclusions involve the audit adjustments and disclosures considered necessary and the type of audit opinion to issue (i.e., qualified, unqualified, adverse, disclaimer). The audit process is, therefore, the principal activities that the CPA performs, referred to as a "financial audit." These activities are undertaken to satisfy the auditor that the probability of material errors is not significant and the financial data conforms to generally accepted accounting principles

FIGURE 4

SIMPLIFIED VERSION OF THE INFORMATION ECONOMICS MODEL



Source: Adapted from Driver and Mock (1975), p. 491.

(gaap). Such procedures are guided by pronouncements of the profession known as generally accepted auditing standards (gaas). The output of the model is the final auditor report and the rewards and resulting risks to the practitioner (payoffs). The auditor is viewed as an integral, unique part of the audit process. The CPA conducts, oversees, and guides the entire process.

The arrows in the model indicate hypothesized relationships between variables and the flow of the system. For example, the nature of the financial statements of the client affect the evidence gathering procedures. Two directional arrows hypothesize a feedback relationship. For instance, the audit procedures undertaken determine the environmental factors considered and in turn these factors may then lead to revisions in audit programs. Key relationships presented in the model are discussed later in this chapter.

Constructs Presented in the Model

The most important variable of the model is "the Auditor." An audit is a complex undertaking that is largely grounded in the professional judgments of the auditor, as tempered by gaap and gaas. The auditor specifies the direction (audit programs), extent (size of samples, evidence examined), timing, and eventual conclusion of the audit. Knowledge of the decision

models and limitations of auditors is, thus, vital in order to maintain quality control and improve existing practice. This is the focus of the auditing HIP research discussed in Chapter II and this study. As noted in the model, the auditor's judgment appears to be greatly influenced by several factors indicated: HIP limitations; behavioral traits; education and training; and professional experience. The HIP limitations of decision makers and specifically auditors were discussed in the previous chapter and are well documented in the literature. The limitation of particular importance and relevance to this study is the common use of heuristic rules by humans to arrive at decisions in complex, uncertain situations. An audit is a good example of such a situation. This study explores whether auditors employ the Representativeness Heuristic (Tversky and Kahneman, 1974), discussed in Chapter II, in weighing various environmental cues in order to arrive at difficult audit decisions.

"Behavioral traits" are human characteristics that substantially affect decision making. Numerous factors may be placed in this category. It is beyond the scope of this study to compile an exhaustive list of them. However, the following traits are noted by Libby and Lewis (1977), in reviewing the psychological and accounting research findings, as being among the most significant:

(1) intellectual ability;

(2) personality;

(3) cognitive structure (style);

(4) attitudes; and

(5) demographics (age, sex, etc.)

Libby and Lewis refer to these variables as "personal characteristics." There have been numerous accounting studies investigating the impact of these factors on decision making, e.g., the research on cognitive style reviewed in Chapter II, Dermer (1973) on the relationship between cue usage and tolerance of ambiguity.

Subject training and experience, as noted earlier, have also been found to significantly influence judgments (Uecker and Kinney, 1976; and Swieringa et al, 1976). This finding is especially pertinent to auditing research in light of the highly specialized and in depth training of the auditor and suggests CPAs may possess unique information processing capabilities and limitations.

The evidence gathering procedures noted are activities performed to gather sufficient information in order to express an opinion on the financial statements. The steps indicated in the model are taken from Arens and Loebbecke (1976) and are characteristic of those frequently mentioned in the professional literature.

A key distinction is made in the type of evidence weighed by the auditor. Two major types are enumerated:

(1) "hard evidence"; and

(2) "environmental factors"

Hard evidence represents reasonably objective facts discovered during an audit, e.g., examination of an invoice, recalculating depreciation, observing and counting fixed assets. The six types of hard evidence noted in the model (Robertson, 1976) appear often in auditing texts and standards.

Environmental factors are characteristics of the client and its economic setting and the nature of the engagement. The factors listed are examples of major variables widely noted in the professional literature, many of which were discussed in Chapter II. Since there has been only scant research in this area, the identity and significance of the environmental cues actually utilized by auditors are not known. This research study addresses this issue. Thus, the list of factors presented in the model can only be viewed as tentative and conjectural at this point.

An important distinction between these two major types of evidence is that, whereas the importance and meaning of hard evidence cues are likely to elicit a high degree of consensus among auditors, environmental factors are highly subjective. For example, three auditors would probably agree on a physical inventory count but have widely differing views on the significance

of the fact that the client is a "growth firm." Does this characteristic of the client, i.e., strong growth, imply that there is additional risk to the auditor or that special audit programs are needed? Virtually all of the auditing texts and standards have dealt with procedures for gathering and weighing hard evidence, e.g., audit programs, constructing and evaluating statistical samples, alternate procedures. Yet, little recognition and attention has been paid in the professional literature to this vital distinction between hard evidence and environmental factors and its implications to audit procedures. Corless (1972) noted this difference when he identified two types of audit evidence: sample and non-sample evidence; this distinction is analagous to the one made in the model presented.

The final element of the model that substantially appears to affect audit decisions is the relative subjective risks and rewards (e.g., audit fee, prestige of having a well known client) involved in a given situation. The professional literature frequently notes the keen awareness by auditors of their legal liability and the risk of government take-over; e.g., Chazen and Solomon (1975). A number of substantial court settlements against CPA's in recent years has further placed the risks involved in the forefront of the minds of auditors. Newton (1977) found that audit partners appeared to

consider the risk of an issue in making materiality decisions. The level of risks and rewards are generally acknowledged in the auditing profession to be important factors weighed in audit judgments.

Hypothesized Relationships

The hypothesized relationship in the model of greatest importance to this study is that audit judgments are significantly affected by environmental factors. This relationship implies that it is very important to determine which environmental cues are relied upon and whether such reliance has beneficial or detrimental effects on the quality of audit decisions. Such findings may suggest alterations in audit procedures or training to minimize the deleterious effects, if any, of employing environmental biases.

Another significant relationship suggested by the model is that the nature and depth of audit procedures employed to gather evidence is materially affected by environmental factors, e.g., auditors may do less extensive testing on a long time client and rely a great deal on prior working papers.[3] This relationship is significant in that the auditor may fail to discover an irregularity that would have altered the final audit report, leaving

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[3] See Mock and Turner (1978) on the presence of anchoring in auditor decisions.

the auditor open to legal liability. The relationship between environmental factors and the audit process appears to be two directional, i.e., environmental factors affect the selection of audit procedures and conversely audit procedures may lead to the discovery of environmental cues altering the auditor's perception of the client and the weighting placed on these cues. This "feedback" relationship is also presented for hard evidence and is commonly referred to in auditing texts, i.e., the audit process uncovers hard evidence and this evidence (e.g., several errors in classifying invoices) may lead to additional or alternate audit steps.

The a priori belief that audit procedures and conclusions are affected by environmental factors is based on the contention that auditors often resort to heuristic rules (e.g., Representativeness) that rely on environmental data. Such a belief appears consistent with the findings of HIP research in psychology and auditing and the professional literature. The model illustrates that the auditor possesses several attributes (e.g., HIP limitations, behavioral traits, training and experience) that are brought to any engagement, and it is the auditor who determines the direction and conclusion of an audit. It is asserted that CPAs have subjective prior beliefs (heuristic rules) concerning a client before the audit begins based on past experience with the client or with

similar firms from their professional and educational background.

The model presents a "feedback" relationship between hard evidence and environmental factors. This implies that hard evidence discovered during an audit may alter the heuristic rules utilized. Conversely, the presence of certain environmental factors may affect the weighting placed on various hard evidence cues, e.g., an auditor may not interpret gapp (hard evidence) as strictly for a large client as a small client (environmental factor). A 4% error rate discovered in a compliance test of a payroll system may be viewed as evidence of weaker internal control (riskier) for a small firm than a large one.

Several other important relationships displayed in the model of the audit decision process will not be discussed either because they are outside of the scope of this study (e.g., affect of risk on audit decisions) or are considered self-evident (e.g., audit conclusions are based on evidence gathered). The research hypotheses to be tested in this study are now discussed. These hypotheses are based on the relationships presented and findings supporting the model of the audit decision process.

Research Hypotheses

The central focus of the study is related to the following hypothesis:

H1: Audit judgments are significantly affected by environmental factors.

Several studies in psychology have found the use of heuristics by decision-makers, e.g., Kahneman and Tversky (1973), Oskamp (1965). Additionally, the experiments by Uecker and Kinney and Swieringa, et al, suggest the existence of the representativeness bias among auditors or auditor surrogates. Neither of these studies, however, dealt directly with environmental factors related to the audit client or engagement, the emphasis of this proposed experiment.

A second hypothesis relates to the relative reliance and inter-relationship between environmental cues:

H2: There are substantial differences in the weighting placed on various environmental cues. Additionally, the interaction of cues has an important impact on audit decisions.

In a given decision context auditors are anticipated to heavily rely on a few environmental cues while only incidentally considering others. The studies by Ashton (1974a), Joyce (1976), Hofstedt and Hughes (1977) and Boatsman and Robertson (1974), reviewed earlier, discovered that subjects significantly relied on a relatively small number of cues. A major purpose of this study is

to attempt to identify a few of these important environmental biases.

The interaction of key environmental factors is also expected to significantly influence audit judgments. For example, the reputation of a client may be a minor consideration to auditors. However, reputation coupled with age, i.e., an established, reputable client, may have an important affect on audit conclusions.

H3: Auditors lack self-insight as to the significant reliance placed on environmental factors.

This third hypothesis essentially asserts that auditors have poor self-insight of their decision rules. A consistent finding of HIP research in psychology and auditing has been that decision makers appear to have little self-insight into the weights of cues and form of their respective decision model, e.g., Joyce (1976), Hofstedt and Hughes (1977). This hypothesis has important implications, since, as noted before, environmental biases may lead to systematic errors in processing audit evidence and inappropriate decisions. If auditors are unaware of such biases, these errors will continue. Only by identifying the usage of environmental cues by auditors can CPA s be in the position to compensate for any resultant judgment errors.

The model suggested that the reliance placed on hard evidence by an auditor may be affected by the

presence of environmental factors. In essence, a CPA may interpret and weigh hard evidence differently for, say, a new client versus a long time client. This relationship is examined in this study and leads to the following hypothesis:

H4: The weighting placed on a hard evidence cue is materially affected by the existence of environmental factors

Affect of Demographic Factors, Training and Experience as Intervening Variables

The first four hypotheses presented deal with the impact of environmental factors on audit decisions and, thus, test for the existence of the Representativeness bias among auditors. The self-insight of the auditor regarding the reliance on environmental cues is also examined. The next three hypotheses assert relationships between the relative impact of environmental factors on audit judgments and other attributes of the auditor. The model suggests that the auditor possesses three additional attributes other than HIPS limitations that significantly influence audit decisions:

(1) behavioral traits;

(2) education and training; and

(3) professional experience.

The fifth hypothesis deals with the affect of one of the behavioral traits, size of CPA firm affiliation (demographic factor).

H5: The significance of environmental factors is dependent on the size of the CPA firm. Smaller firms are anticipated to exhibit heavier reliance on environmental cues.

The size of the CPA firm in which the auditor is employed may be a significant intervening variable. The literature contains frequent allegations that smaller CPA firms are substantially affected by environmental factors of the client (e.g., size of client, etc.) and have greater difficulties in maintaining an independent frame of reference than larger firms. This can especially be the case when the client's fees represent a substantial portion of the firm's total revenues. In an article entitled "Why Didn't Auditors Find Something Wrong with Equity Funding?" (May 4, 1973), Andrews lists the economic dependence and long time client association of the principal auditing firm, Wolfson, Weiner, Ratoff and Lapin, CPA's, as the major contributing factor to the inability of the auditors to discover the existence of material fraud. Wolfson, Weiner, Ratoff and Lapin was a medium-sized, rapidly growing firm; Equity Funding was substantially larger than any of their other clients.

The division of firms by the AICPA into two sections (SEC Practice Firms Section and Private Companies Practice Section) was accomplished in the belief that some of the smaller firms lacked the resources, expertise and appearance of independence to engage in the audit of SEC

clients where there are great complexities and legal liability. This suggests that the auditing profession recognizes that such CPA firms may be greatly influenced by environmental biases.

This hypothesis is examined since the existence of differences in the decision rules of CPA's from small, medium and large CPA firms is a controversial issue currently facing the profession and, therefore, warrants empirical research. However, this hypothesis is viewed as highly conjectural; there are few empirical findings on this matter. Frishkoff (1970) found the size of the auditing firm was not a discriminating variable in audit consistency opinions. H5 posits there is a difference in reliance on environmental factors among auditors from varying sized firms due to the overwhelming assertion in the professional literature of such a difference. However, this hypothesis is viewed as tentative and largely an empirical issue.

H6: The reliance on environmental factors is a function of the level of professional experience.

H7: There will be a significant difference between student judgments and auditors, i.e., students are poor surrogates for practicing auditors.

The final two hypotheses deal with the familiarity (experience and training) of the subject with the decision context and the resulting impact of environmental factors.

The sixth hypothesis states that there will be progressively greater weighting placed on environmental factors as subjects possess higher levels of audit experience, i.e., CPA's having more experience will tend to rely to a greater extent on environmental biases in arriving at a decision.

The above hypothesis is based on the findings of Swieringa et al (1976), suggesting that subjects tend to use the Representativeness bias when they are familiar with the decision context and have well-defined models of the process in mind. As a CPA gains experience it is anticipated that he obtains a "clearer focus" of the auditing process and the issues and trade-offs of audit decisions. The experienced CPA also possesses the exposure to various clients such that a clearer heuristic rule based on environmental factors may be formulated which the auditor has reasonable confidence in applying, e.g., a CPA, who has been on an engagement for several years, may form a model of the firm that significantly influences audit judgments. This alleged influence led to the recommendation by several groups of mandatory rotation of auditors (e.g., Metcalf Report).

The final hypothesis that students are poor surrogates for auditors relates also to the specialized training and experience of auditors and the complex issues and trade-offs present in an audit. Students

appear to lack the background necessary to develop a well-defined model of the audit process and, thus, it is expected that they will employ different decision rules than practicing CPA s.

Replication of Main Experiment Using Students

The experiment, to be discussed in depth in Chapter IV, utilizes practicing auditors as subjects, requested to arrive at an audit reporting decision. The entire experiment is replicated with auditing students as surrogates for CPA s. The purpose of this replication is to ascertain whether students are reasonably accurate substitutes for practicing auditors. Students provide the advantages of better availability in terms of numbers, time, and cost. However, researchers have long been concerned with the validity of attempting to generalize the results of studies employing students to their "real world" counterparts. This is especially of concern in accounting which is a highly specialized, technical area. There appears to be a trade-off between lower cost in using student subjects at the expense of loss in external validity. However, there is disagreement as to the extent of this apparent loss in validity.

Several studies have compared the responses of students with practicing decision makers. Unfortunately, the results are ambiguous. HIP research in psychology has

consistently shown a strong similarity between students and their counterparts in information processing capabilities and biases. Experts also appear to display the same biases in the laboratory as in the field (Slovic et al, 1977). Studies in accounting by Dyckman (1966), Mock (1969) and Hofstedt (1972) discovered strong correspondence of student decisions with practicing experts.

However, there has also been evidence in several accounting/business studies that students are poor surrogates. Alpert (1967) and Copeland et al (1973) discovered significant differences in opinion change and attitudes respectively of students and decision-makers. Abdel-Khalik (1974) compared the loan decisions of MBA students and loan officers and concluded: "With 57% effectiveness, and with no knowledge of the direction of the bias, using students as substitutes for bankers in this situation appears to have provided unreliable measures of bankers' performance" (p. 750). In reviewing the research on the appropriateness of student surrogates Dickhaut et al (1972) stated that there appear to be no conditions to establish the adequacy of students; the problem appears to be situation specific.

There have not been any studies on the appropriateness of students as surrogates for auditors. An additional contribution of this study is to shed light

on this vital issue by replicating the main experiment. Auditing students are employed since they are perceived to be the closest substitutes for practicing CPA's. The findings produce evidence to evaluate the validity of prior research in auditing using students, e.g., Hofstedt and Hughes (1977), and provide guidance for future research in weighing the "trade-offs" of employing student substitutes.

CHAPTER IV

RESEARCH METHODOLOGY

The first part of this chapter evaluates various research approaches for testing the research questions. After an analysis of alternative approaches it is concluded a laboratory experiment would be most appropriate for this study. The subjects and setting for the experiment are enumerated. The test instrument (audit cases) is described along with a discussion of the accounting issues involved. The environmental and demographic variables to be examined are identified and justified for study by reference to the literature where there is widespread recognition of their apparent impact on audit decisions.

The manipulation of the independent variables is specified. The overall research design is then presented with a brief description of the planned replication of the main experiment utilizing University auditing students as surrogates.

The pilot study is outlined. Modifications to the research design and test instrument resulting from findings of the pilot are noted. The statistical analyses to be performed are identified and justified.

The final part of the chapter contains a discussion of the anticipated problems and limitations of the research methodology used. The steps taken to minimize these problems to insure the validity and usefulness of the findings are described.

Research Approach

Kerlinger (1973) identifies four basic types of research (p. 395):

(1) field studies;

(2) survey research;

(3) field experiments; and

(4) laboratory experiments.

Any of these four approaches may be used to examine the affect of environmental factors on audit decisions, the central research issue. However, each approach has a number of advantages and disadvantages to be weighed. The various types of research are now evaluated as to their adequacy in addressing the research theme in this study.

Field Study

A field study entails an ex post facto examination of the relationship between variables in an actual setting. For this study, such an examination would involve investigating documented audit decisions and

endeavoring to relate them to environmental factors. Frishkoff's (1970) attempt to model auditor's opinions where a violation of consistency is discovered is a prime example of this technique. Another procedure would be to examine working papers on various audit engagements for evidence of explicit or implicit reliance on environmental cues.

The major strengths of field studies are the high level of realism present and the strong variance commonly discovered of variables in such settings. Field studies, however, have one major limitation; they are ex post facto and, thus, the researcher cannot control for extraneous variables, manipulate variables of interest, or randomly assign subjects. Therefore, such studies have weak control (internal validity) and their findings should be viewed with great care and skepticism. Another problem associated with field studies is that they may not be feasible because of high costs (e.g., requiring excessive time) or lack of cooperation from subjects. For example, the approach of examining audit working papers is probably impractical in most cases due to client confidentiality and the extensive training and time required to interpret such papers. Because of the weak control and precision offered by this approach, the use of a field study is not considered appropriate for this research effort. As will be noted, the laboratory

experiment provides the opportunity to examine this research issue at a relatively low cost and with strong control.

Survey Research

Several survey studies have investigated the impact of environmental cues on audit judgments (Woolsey, 1973b; Pattillo, 1974, 1976). Survey interviews and questionnaires offer the advantages of potentially large sample sizes (Pattillo, 1976) and strong accuracy.

Two major assumptions implicit in survey research are that the respondent: (1) is aware of his behavior and can answer the questions, and (2) is honest and unbiased. These assumptions present special problems in this study. Several prior Human Information Processing studies have found subjects to have poor self-insight of their decision rule(s) (Joyce, 1976; Hofstedt and Hughes, 1977). In fact, one of the research hypotheses (H_3) in this study is that auditors are unaware of the reliance on environmental factors in decision making. Therefore, if a CPA was asked, "Which environmental factors, if any, do you employ in arriving at audit decisions?" there is question as to whether the auditor could

accurately respond. Thus, the results of such research should be interpreted with caution. The survey studies on materiality cited suffer from this major limitation.

Another difficulty is that the accounting profession is currently under heavy attack from several groups, claiming that auditors are not independent and have quality control problems. In such an environment, it is not unreasonable to expect CPA's to be in a defensive position. The auditor is keenly aware that independence in fact as well as in appearance is crucial. Any survey question implying the auditor is biased in any way can be anticipated to be answered in the negative. For example, if a question were posed: "do you set looser materiality rules for large clients over small clients?", it can be expected that the auditor would respond "no," even if this were the case in practice. Kerlinger discusses this problem: . . .

> (T)he survey interview can temporarily lift the respondent out of his own social context, which may make the results of the survey invalid . . . For example, a mother, when queried about her child-rearing practices, may give answers that reveal methods she would like to use rather than those she does use (p. 423).

Due to the validity problems discussed of survey responses, especially in this research setting, the survey approach does not appear suitable for testing the research issue at hand.

Field Experiment

Despite the advantages of relatively strong control of extraneous variables, realism, power to manipulate and randomize, and generally stronger effect of the variables than in lab experiments, a field experiment does not appear feasible for this study. Observing actual "on the job" audit decisions would not appear to be a viable approach. First of all, even if auditors were willing to cooperate (client confidentiality problems), how could the experimenter insure that subjects were facing similar audit situations and decisions? Each audit is in a unique setting and presents numerous special problems. Would it be valid to compare the decisions of two auditors on different engagements? Control over extraneous variables would not appear possible. Several auditors could also not be expected to redo the same audit procedures, unless it were a minor task, which would be of little interest. Additionally, observing actual audit decisions would require a great deal of time to arrive at a reasonable sample size. Because of the difficulties cited, especially cooperation problems, the field experiment does not appear appropriate for this study.

Laboratory Experiments

By the process of elimination and due to its inherent strengths, the laboratory experiment appears to

be the most suitable approach for this study. This is to be expected, since HIP studies, of which this is one, are overwhelmingly lab experiments because of the greater control offered over the myriad of extraneous variables present when observing human behavior. Kerlinger (1973) notes the major strengths of the laboratory experiment are:

(1) optimal control over extraneous variables;

(2) random assignment and the ability to manipulate variables; and

(3) precise operational definitions of variables, resulting in less error variance.

Emory (1976) emphasizes the importance of the major advantage of the laboratory experiment, its greater internal validity:

> The overwhelming advantage of (the lab experiment) is that no other method approaches its power to determine causal relationships between variables. Albeit, imperfectly, the researcher can control contamination from extraneous variables more effectively than in other designs. He can bring together combinations of variables to test rather than having to search for some fortuitous combination of these variables in nature (p. 302).

Laboratory experiments are not without weaknesses, the greatest of which is the questionable external validity of such studies. Since lab experiments are staged in contrived, artificial settings, the results can be generalized to the "real world" only with great caution. Kerlinger (1973) states:

> The temptation to interpret the results of laboratory experiments incorrectly is great. . . Similar results may be obtained in real life situations, and there is evidence that they do in some cases. But this is not necessarily so. The relations must always be tested anew under non-laboratory conditions (p. 400).

Another limitation of lab experiments is the lack of strength of independent variables. The magnitude of variance is usually weaker than other research approaches due to the artificial, controlled setting.

Laboratory experiments, however, offer the optimal means for discovering fundamental relationships among variables due to the presence of strong internal validity. Problems of external validity can be minimized by employing a realistic setting and selecting a representative, random sample of subjects. The discussion to follow on the test instrument outlines the measures taken to strengthen external validity in this study; it is believed that external validity is as strong as possible for the research question at hand.

Subjects and Experimental Setting

To attain a high degree of external validity it was decided that subjects of the experiment preferably possess three characteristics:

(1) are practicing auditors;

(2) represent a good cross section of CPAs from various sized firms; and

(3) are from the higher staff levels (partner, manager).

The advantages of having subjects that meet the first two criteria are self-evident. The third characteristic is important, since individuals at the higher management levels are the ones that make the critical, subjective professional audit judgments that are investigated in this study.

After considering various approaches of obtaining the desired subjects, the selection of auditors from professional meetings appears most appropriate. CPAs attending such meetings generally meet all of the three criteria stated. The experiment is administered during a professional meeting of one of the bodies (discussion groups, committees) of the California Society of Certified Public Accountants. Subjects are selected from three meetings:

(1) Downtown/Wilshire Discussion Group, Los Angeles;

(2) Accounting Principles/Auditing Standards Committee, Los Angeles Chapter; and

(3) Accounting Principles/Auditing Standards Committee, Santa Ana Chapter.

Active participation in professional organizations is stressed as an integral part of the job of auditors at the higher staff levels. Also those attending tend

to have a good deal of experience. Members of the Society must have a CPA license and, thus, at least two years of experience.

The meetings selected are primarily attended by auditors, especially the Accounting Principles and Auditing Standards Committees. Such settings increase the probability of obtaining subjects normally facing the type of decision context dealt with in this study. This minimizes the number of CPAs specializing in taxation or management advisory services. Accountants outside of auditing encounter significantly different job pressures and environments and are oriented toward the interests of the client.

Auditors are, thus, taken from one geographic area; however, there is a priori reason to believe that they are representative of CPA s nationwide. The large scale presence of many industrial concerns in California insures that auditors face engagements involving clients of all sizes, industries, and complexities. The known mobility of the labor market into the state further enhances the representativeness of CPA s of this area.

Test Instrument/Decision Setting

To further strengthen external validity, subjects are presented two actual, disguised case situations (McAllister, Inc. and Winslow Company). The selection of

complex cases taken from practice is done to achieve greater realism in the decision setting. The familiarity of the subject with the setting has been found to substantially affect judgments (Swieringa et al., 1976). Further, heuristic rules appear to be used most frequently in difficult information processing situations (Tversky and Kahneman, 1974). This study attempts to determine whether auditors exhibit environmental biases. Therefore, to obtain the desired realism and complexity, the selection of actual cases appears optimal. Several cases were screened for the appropriate complexity, length, and generality of the issues involved. The attempt was to find cases entailing issues that most accountants were knowledgable of, not topics restricted only to a specialized group of practitioners. The final cases that were selected are described in great depth (source, accounting issues, etc.) in a later section to follow.

In the McAllister and Winslow Cases a significant "error" is discovered by the audit staff during the engagement, resulting in a proposed audit adjustment. A description of the firm and the audit issue is presented along with a set of summarized financial statements and key statistics. Auditors are requested to indicate on a seven point Likert-type scale whether:

(1) they would require the adjustment to be made;

(2) footnote disclosure is sufficient; or

(3) a "subject to" qualified opinion is appropriate (McAllister, Inc. case only).

CPA's are, therefore, asked essentially to make a disclosure/materiality decision, i.e., how should the "error" be reported, given its relative apparent impact on the financial statements? This type of a decision represents a high-level, complex, subjective audit judgment.

Respondents also are requested to indicate the weight (reliance) placed in each case on three factors:

(1) Materiality;

(2) Objections of the client; and

(3) generally accepted accounting principles.

The weighting scheme is on a six point Likert-type scale from "the most important factor" to "insignificant or irrelevant." Finally subjects are requested to indicate the reasoning for their audit decision in the case. See Appendix A for the actual test instrument.

All subjects receive identical facts in each case except for the manipulation of the environmental factors (independent variables) to be discussed in the next section. In both cases the client is noted to be under the juristiction of the Securities and Exchange Commission (SEC). SEC engagements present greater legal liabilities and complexities for auditors due to the provisions of the 1933 and 1934 Securities Acts and the generally

larger size of the client. Also the accounting profession has placed most of its emphasis and has had its greatest problems with SEC audits; such audits of publicly traded corporations form the major societal role of the independent CPA.

In each case the auditor faces a dilemma. On the one hand, the auditor is inclined to require the adjustment, since failure to do so would result in higher net income, violating the commonly asserted conservative bias of CPA's. Yet, in each situation the client objects to the adjustment on reasonably strong grounds as to the proper interpretation of generally accepted accounting principles (gaap), the role of financial statements, and/or materiality. The auditor must decide if the "error" is material enough and with proper substance such that the financial statements would be misleading if not adjusted. Thus, the CPA must weigh gaap, objections of the client, materiality and conservatism in arriving at a decision.

Auditors appear to have a "natural" reluctance to reflect higher net income because of the tendency towards conservatism that is usually exhibited in accounting and auditing (Scott, 1975). Boatsman and Robertson (1974) found that materiality limits for the disclosure of loss items were set lower than those for consistency or uncertainty items; these results suggest the

conservatism bias of auditors. However, a decision to alter the financial statements in the face of management objections requires strong justification; auditors must possess a high degree of confidence in their judgment.

The proposed audit adjustment is approximately 4.5% and 6% of net income and earnings per share for the Winslow Company and McAllister Inc. cases respectively. The relatively small size of the "error" makes the determination of materiality a difficult, "border line" decision. Pattillo (1976) found the most frequently used "rule of thumb" for materiality judgments to be 5-10% of net income. Therefore, the items at issue are at the lower end of this commonly quoted range.

At the end of the experiment CPA s are asked to provide the following demographic data:

(1) age;

(2) years of audit experience;

(3) size and type of CPA firm employed with;

(4) staff level;

(5) academic degrees;

(6) membership of CPA firm in SEC Practice Firms Section of the American Institute of CPA s; and

(7) area of specialization (Auditing, Tax, Management Advisory Services, other).

The demographic variables listed are studied since they may be important intervening factors affecting the impact of environmental cues on audit decisions.

The audit decisions (requiring adjustment, footnote disclosure, and/or a qualified opinion) are the dependent variables and are utilized to test for the impact of the various environmental factors on audit decisions, i.e., hypotheses 1 and 2. The relative affect of each cue and the interaction of the factors on decisions are examined by manipulating the environmental cues. The open-ended question at the end of each case asks for the perceived factors (cues) used by the auditor in arriving at his decision and, thus, is the means for examining the degree of self-insight of the CPA in weighing environmental variables (H3). This open-ended question should also be of great value in analyzing the perceived decision process and factors relied on by the CPA in each situation.

A second set of Likert-type Scale Questions are employed to test the weighting placed by the auditor on hard evidence cues in the presence of environmental factors (H4). The demographic data obtained is used to investigate the final two hypotheses, H5 and H6 dealing with the affect of CPA firm size and amount of professional experience, respectively, as intervening variables.

Summary of Approach

As noted earlier, laboratory experiments, such as this, offer a means of obtaining strong internal validity but may suffer from weak external validity. To minimize this problem, two actions are taken in this study:

(1) the cases are derived from actual situations and are, thus, realistic audit decision settings; and

(2) great care is exercised to obtain a representative sample of auditors.

The "McAllister, Inc." case is based on a case presented at the 1976 Trueblood Seminar labeled the "Shangri-La Company." The Trueblood Seminars, supported by the Touche Ross Foundation, are held annually. Several universities are invited to send accounting professors to discuss important issues facing the accounting and auditing profession. Several cases, drawn from the practice of Touche Ross and Company, such as "Shangri-La," are discussed and analyzed. The "Winslow Company" case is also an actual audit situation taken from a training session offered by one of the "Big Eight" CPA firms.

The cases were further submitted for review to five auditors at the manager or partner level and were revised as needed from comments and suggestions provided. All of the CPAs contacted believed the settings to be

realistic and complex. The cases were additionally modified from the results and recommendations received in the pilot study; a full description of the pilot and these changes are presented in a later section of this chapter. The utilization of realistic cases provides a decision setting in the experiment indicative of those encountered in practice and is not overly simplistic or artificial. This should lead to greater external validity in that cases are not contrived but representative of decisions faced by practicing auditors.

The choice of using professional meetings to select subjects, as discussed earlier, leads to a good cross-section of CPA.s. These actions of obtaining a representative sample of auditors and using actual cases is perceived to be as close a simulation of actual audit decisions as possible in a laboratory setting.

Accounting Issues Involved

The McAllister, Inc. case involves a real estate development company. The firm is attempting to obtain rezoning for condominiums on a parcel of land it owns. If successful in its efforts, the parcel would be more valuable. However, the corporation has gone through all legal steps without success and hopes to obtain the desired zoning through a pressure campaign on local political groups. The parcel, as it is presently zoned,

is appraised to have a market value that is below its book (carrying) value in the financial statements.

The audit staff proposes an adjustment to reduce the carrying value of the land and accordingly recognize a loss; they perceive little chance of rezoning on the parcel. The doctrine of conservatism, thus, appears to warrant this adjustment. Management objects on three grounds:

> (1) the role of financial statements is to present information without purposeful bias to decision-makers;
>
> (2) the proposed adjustment is a bias (conservatism) benefitting only the auditor. Full disclosure in a footnote of all facts appears to be more appropriate. There still remains a significant uncertainty as to the outcome of the firm's rezoning efforts; and
>
> (3) the "write-down" is not material.

The key accounting issues in the McAllister, Inc. case are the degree of uncertainty in rezoning the parcel and the role of financial statements in reflecting such uncertainty. The latter issue was dealt with in Financial Accounting Standards Board (FASB) Statement No. 5, "Accounting For Contingencies," issued March 1975. Statement No. 5 requires a loss to be recognized when two conditions exist:

> (1) Information available prior to the issuance of the financial statements indicates that it is probable that an asset had been impaired or a liability had been incurred at the date of the financial statements. It is implicit in this

condition that it must be probable that one or more future events will occur confirming the fact of the loss.

(2) The amount of the loss can be reasonably estimated (paragraph .08).

Statement No. 5 requires disclosure "when there is at least a reasonable possibility that a loss . . . may have been incurred" (paragraph 10). Losses that have a remote chance of occurring are to be disclosed at the discretion of management and the auditors when considered necessary for full disclosure.

Statement No. 5 defines these key probabilistic terms emphasized above as:

Probable. The future event or events are likely to occur.

Reasonably possible. The chance of the future event or events occurring is more than remote but less than likely.

Remote. The chance of the future event or events occurring is slight (paragraph .04).

In the McAllister, Inc., case it is subject to dispute as to whether failure to rezone the land is "probable" or "reasonably possible." The second condition of FASB Statement No. 5, i.e., reasonable estimation of the amount of the potential loss, appears to be met in the case. The materiality of the adjustment is also open to question. Thus, the case requires the auditor to make a high level, difficult, subjective decision.

The parcel is inventory for McAllister, Inc., a real estate dealer. If it is believed that a loss is

probable and material, the adjustment can be justified by reference to "lower-of-cost-or-market" rule applied to inventories. Accounting Research Bulletin No. 43, Chapter 4, Statement 5 states:

> . . .Thus, in accounting for inventories, a loss should be recognized whenever the utility of goods is imparied by damage, deterioration, obsolescence, changes in price levels, or other causes. The measurement of such losses is accomplished by applying the rule of pricing inventories at cost or market, whichever is lower (paragraph .08).

The major issue in the Winslow Company case is revenue recognition. Winslow, manufacturers of computer peripheral equipment, sold a large order of magnetic tapes to a business supply house. This transaction is unusual on two counts: Winslow normally sells to the ultimate user, and the sales agreement included a provision allowing the buyer to return any unsold tapes within three years. This provision was added to persuade the buyer to make such a large purchase. The profit from the sale is especially desired by Winslow management, since the Company is in the process of floating a new stock issue and naturally wishes to present a good earnings picture.

The audit staff argues that this transaction is essentially a consignment sale due to the return provision. As such, revenue would be recognized over time as the tapes are sold to ultimate users. The staff asserts that an accurate return allowance cannot be established,

because this is a new type of customer. Additionally, a confirmation from the buyer reveals that tape sales are slow.

Winslow's management disagrees with the proposed adjustment to reduce earnings. They state that a return allowance can be determined based on industry averages. Management further states that the tapes can be readily sold to other customers, if returned, and the adjustment (4.5% of income) is immaterial. The full order of tapes was shipped to the buyer, and all amounts due have been collected.

Accounting Principles Board (APB) Statement No. 4, Chapter 6, provides guidelines as to when revenue is to be properly recognized. The "Realization" pervasive measurement principle states:

> Revenue is generally recognized when both of the following conditions are met:
>
> (1) the earning process is complete or virtually complete, and
>
> (2) an exchange has taken place (paragraph 14).

The "earning process" are the "activities that give rise to the revenue--purchasing, manufacturing, selling, rendering service, delivering goods. . ." (paragraph 13). Sprouse and Moonitz (Accounting Research Study No. 3, 1962) concur with this view of the earning process; they contend revenue should be realized in the period in which

the major economic activity necessary to the production and disposition of goods is performed (p. 148-150).

In the Winslow case there is little doubt that an exchange has taken place; the goods were delivered. However, it is debatable as to whether the earning process is "complete or virtually complete" due to the return provision of the sale. ARB No. 43, Chapter 1A notes that: "Profit is deemed to be realized when a sale in the ordinary course of business is effected, unless the circumstances are such that the collection of the sales price is not reasonably assured" (paragraph .01). APB Opinion No. 10, in examining this issue in reference to installment sales, provided a general guideline for revenue recognition in such cases by stating: " . . . (R)evenues should ordinarily be accounted for at the time a transaction is completed, with appropriate provision for uncollectible accounts" (paragraph .12). Of course, whether an "appropriate" allowance for returns can be established in the Winslow case is an issue subject to judgment.

An important argument supporting or refuting whether consignment sale accounting is appropriate is the intent of the parties to the transaction, i.e., substance over form. One might assert that neither party contemplated a consignment arrangement as evidenced by the full payment of amounts due by the buyer and

delivery of all merchandise. On the other hand, the liberal return provision of the sale can be construed as intent to create essentially a consignment relationship. As Meigs, Mosich and Larsen (1975) note, two key reasons for consignment sales are:

> . . . (The producer or wholesaler) may be able to persuade dealers to stock the items on consignment whereas they would not be willing to purchase the goods outright . . .From the viewpoint of the consignee, . . . he avoids the risk of loss if he is unable to sell all the goods (p. 452-453).

Winslow Company's management was motivated to persuade the buyer to accept the goods in order to improve the earnings posture of the firm for the planned stock issue.

Statements of Position No. 75-1 and 76-1 (1975; 1976) issued by the Accounting Standards Division of the American Institute of Certified Public Accountants deal specifically with the question of revenue recognition where there is a provision for right of return. These statements recommend revenue should be recognized only when all of the following conditions are met:

(1) Price is substantially fixed at the date of exchange;

(2) The buyer has made full payment or is indebted to the seller and payment is not deferred until the merchandise is sold;

(3) Obligation to the seller is not changed

because of theft or physical destruction of the merchandise;

(4) Buyer must be a separate economic entity from the seller;

(5) Seller does not have significant obligations for future performance to bring about resale of the merchandise; and

(6) Future returns can be predicted with reasonable accuracy.

Conditions one through five above appear to be present in the Winslow Case. Whether the last criteria is met is subject to dispute. These statements of position reflect a conservative view as to revenue recognition in such circumstances, because all conditions must be fulfilled before recognition is advocated. This conservative bent is indicative of that encountered in practice. There is reluctance to reflect higher revenues and, thus, income.

As in the first situation, the audit judgment involved in the Winslow Company case is a difficult decision. The complexity of the decisions may lead auditors to employ heuristic rules. Once again materiality is an additional consideration that must be weighed.

Environmental Factors and Demographic Variables Studied

The decision of which environmental factors to study is a very difficult one, since there has been very little research in this area. Ideally one would wish to examine the environmental cues having the greatest impact on audit decisions; this would pinpoint the major influences on audit judgments and suggest important changes needed in audit procedures to avoid substandard performance. Such an approach produces the greatest immediate payoff. However, these important environmental cues are not presently known. A major purpose of this study is to identify a number of environmental factors significantly relied upon by auditors. Therefore, the researcher in this area faces the circular problem of desiring to investigate the most vital environmental cues but having to first conduct ad hoc empirical research to discover these cues. The approach taken in this study is to examine environmental variables frequently asserted a priori in the professional literature to be important factors in audit judgments.

The three environmental factors (independent variables) investigated are:

(1) size of client (total sales);

(2) length of association with client; and

(3) growth pattern of client.

Justification for Independent Variables Studied

The size of the client and term of association are often mentioned by critics of the auditing profession as factors that appear to bias auditors and affect their independence. The Metcalf Report, as noted before, recommends the rotation of auditing firms after a stated period; the Report also alleges that major corporations significantly influence audit decisions. The findings of this study regarding these variables (client size and association) could shed valuable light refuting or supporting the allegations of critics.

The growth pattern of the client was selected for study due to the widespread assertion in the literature that corporations often wish to project an image of growth. To do so, accounting methods may judiciously be selected in order to "manage earnings" and show an upward trend in income. Pressure is placed on the auditor to accept these reporting methods so as not to alter the "trend" of earnings. Thus, auditors may be significantly influenced by the presence of a strong growth pattern. This situation may cause auditors to be reluctant to require the use of alternate accounting methods considered more appropriate or disagree with management or other vital accounting matters that dampen

earnings, e.g., the adequacy of the allowance for uncollectible accounts, warranty obligations.

Arthur Dixon (1977), past president of the New York Society of Certified Public Accountants, discusses this situation:

> Professional managers of publicly-held companies do, I believe, attempt to "manage" earnings. They do so because the marketplace for their stock rewards a smooth and consistent rate of earnings increase with a substantial premium. When the company management accomplishes that objective, shareholders are happy. It is also a lot easier to raise new capital for corporate growth, and continue the delicious cycle of earnings increases.
>
> So the auditor's problem is to see that the earnings reported by management are not distorted by the misuse of accounting principles (p. 15).

As a result of a number of large bankruptcies and frauds, auditors have been accused of complicity with management in presenting misleading earning pictures. A notorious example of these scandals is the Stirling Homex Corporation. In less than four years Stirling Homex rose from a small contracting firm to a leader in the modular housing industry. The Corporation's financial statements reflected a strong growth in earnings through October 31, 1971, only nine months prior to the date (July 13, 1972) a petition for bankruptcy was filed. The earnings trend was largely bolstered by an accounting procedure recognizing revenue upon <u>completion of the manufacturing</u> of a modular unit; revenues from installation were realized on a percentage-of-completion basis.

Benis and Johnson (October 1973) question the appropriateness of these accounting methods:

> What is relevant is that the letters of intent required the manufacture and installation of the modular homes. Under these circumstances, it is difficult to justify an accounting practice that broke up an indivisible relationship and then proceeded to record income on each segment on what appears to be an arbitrary basis. . . . By an apparent arbitrary intracompany pricing policy, corporate profits were "front-loaded" and heavily weighted towards the construction phase of the total operation. Moreover, the installation division picked up profit on partly installed units; justifying it on the percentage-of-completion principle.
>
> This method circumvented the critical event criterion for revenue recognition in that Stirling Homex had no valid monetary claim until the modules were installed. The fact that no progress payments were made by the purchaser would appear to reinforce the belief that the crucial event was installation and until such time as this was completed, the recognition of income was premature and tenuous (p. 866).

The inability to generate sufficient working capital to fuel its rapid growth eventually led to the demise of Stirling Homex. Benis and Johnson insightfully conclude:

> Stirling Homes Corporation became a "slave" to its accounting. With a high price-earnings ratio, it had to maintain its earnings growth. By recording sales at the completion of production, they forced increased production in order to increase earnings (p. 866).

They point out that the inappropriate use of accounting methods to present an image of "growth" occurred in several industries during the 1960's and early 1970's.

> In recent years, companies in industries other than modular homes have utilized premature income recognition to prop up sagging balance sheets. Land development, franchising, home study, and leasing companies provide additional evidence of the practice of premature income recognition (p. 866).

These abuses led the Securities and Exchange Commission to enact Accounting Series Release (ASR) No. 177, "Interim Financial Reporting," in September 1975. ASR 177 requires the auditor to indicate the "preferability" of an accounting method selected when a change in methods has occurred. This action was taken in a move by the Commission to alter the role of the auditor in the process of selecting appropriate accounting methods for a corporation. Auditors are required to take greater responsibility and become an active participant in this process rather than merely acquiescing, as was traditional.

Chazen (1978) attributes the current wave of criticisms of the accounting profession largely to the profession's past inability in many cases to curb innovative accounting procedures by firms to manufacture growth.

> The inability of our profession to maintain credibility was in no small part caused by significant reporting deficiencies, which according to the FASB (in its Conceptual Framework Discussion Memorandum) were principally the result of the following failures:
>
> -Acceptability of two or more methods of accounting for the same facts;

-Switches to less conservative accounting methods;

-Front-ending of income;

-Use of reserves to artificially smooth earnings fluctuations;

-Failure of financial statements to warn of impending liquidity crunches;

-Deferrals followed by "big bath" write-offs;

-Unjustified optimism in estimates of recoverability;

-Off-balance sheet financing;

-Use of the excuse of immateriality to justify omission of unfavorable information or departures from standards (p. 34).

There is some limited empirical support for the contention that the growth pattern of the client may significantly influence an auditor's judgment. Woolsey (1973) and Pattillo (1976) discovered that a large number of survey subjects believed that materiality guidelines should be more stringent when an item might alter an earnings trend; several of the respondents were CPA s.

The auditor also may be influenced by the aura often surrounding "growth" firms; such organizations are often considered to be dynamic, progressive and innovative, e.g., Equity Funding, IBM. This image is depicted in the following description of Stirling Homex Corporation during its growth era:

During this period, the hopes and expectations of diverse groups rose and fell in congruence with the rise and fall in the fortunes of the Company.

> The investment community projected Stirling Homex into the growth and glamour category, the Department of Housing and Urban Development saw in the Company the solution to the nation's low cost housing shortage, and minorities viewed Stirling Homex as a way to finally enter the labor market in the construction industry. (Benis and Johnson, 1973, p. 863).

In such an environment, auditors may be swayed to accept reporting practices and management judgments to sustain the expected "growth." Andrews (1973) argues that this was the situation during the audit of Equity Funding.

Demographic Factors Examined

The following subject background variables are studied:

(1) Age;

(2) Audit experience;

(3) Size of CPA firm affiliated with;

(4) Staff level;

(5) Academic degrees;

(6) Area of specialization (audit, taxation, and/or management advisory services); and

(7) Membership of CPA firm in the AICPA SEC Practice Firms Section.

Age, audit experience and staff level all deal with aspects of professional training and background. These factors may be significant intervening variables

as to the affect of environmental cues. Several studies noted (Swieringa et al, 1976; Libby and Lewis, 1977) found the past experience of the respondent to substantially influence judgment and the use of heuristic rules. These factors are employed to test hypothesis 6, i.e., reliance on environmental cues is a function of the level of professional experience.

The size of the CPA firm and membership status of the firm in the SEC Practice Firms Section relate to the current controversy in the profession as to whether the decision rules and competencies among small, medium and large CPA firms vary substantially. These variables are selected to test hypothesis 5, conjecturing that there is such a difference in reliance on environmental factors between varying sized firms.

The audit practice of larger firms is oriented on SEC clients, and, thus, it is expected such firms will be members of the SEC Practice Firms Section. Smaller firms are not anticipated to be members of this section very frequently. Therefore, membership in the SEC Practice Firms Section is considered to be a CPA firm size indicator. In addition, firms are required to display a high level of competency and familiarity with SEC audits to become a member of this section. The section was devised as a quality control device in an attempt to insure greater expertise on SEC audits. The

study of this demographic variable provides evidence as to whether there is a significant variation in the usage of environmental cues among members and non-members in the SEC Practice Firms Section.

The academic background of the CPA is studied to determine if such formal training affects the usage of environmental cues. Academic degrees are a measure of educational background, a variable in the Model of the Audit Decision Process presented earlier. This variable a priori appears to be an important intervening factor and is, thus, examined in this study.

Area of specialization is used primarily to eliminate subjects having little audit experience and, therefore, having little involvement in this area. Such individuals do not face the decision situations presented in the audit cases. Inclusion of these subjects may severely reduce the external validity of the findings.

Research Design

Manipulation of the Independent Variables

As discussed earlier, the independent variables (environmental factors) chosen for study are:

(1) size of the client;

(2) length of association with client; and

(3) growth pattern of client.

Each of these factors is varied at two levels:

(1) client size, "medium" or "large;"

(2) length of association, "short" or "long;" and

(3) growth pattern, "stable" or "strong growth."

Client size is defined as total sales. A "large" firm is considered to be one that would be among Fortune Magazine's (May 1978a) 500 largest industrial corporations. The "medium" sized firm is twenty times smaller on all financial respects. This would rank the firm below Fortune's second 500 largest enterprises in terms of sales; the range in sales in the second 500 was from $355 - $105 million (June 19, 1978b). Yet, the company would still be a reasonably large firm, e.g., total sales of "McAllister, Inc.," one of the cases, is $31 million.

Subjects evaluating "medium-sized" firms receive the same financial data as other respondents except each number (sales, cost of goods sold, inventory, etc.) is divided by twenty. Therefore, all relative measures and relationships are identical for both large and medium firms, e.g., current ratio, gross margin percentage. The firms are identical as to financial condition and results of operations; the "large" firm is merely a multiple of the "medium" one.

Length of association with the client is varied at either 2-3 years ("short") or 11 and 13 years ("long"). Two-three years was selected as a short period of association, since it is felt that the auditor is just beginning to gain familiarity with the client in such a brief period. A "first year" audit was avoided due to the special risks and conditions widely recognized for such audits; in such cases, the CPA often is especially cautious as a result of the limited knowledge of the client.[4] It is believed that after a ten year association the auditor has a working relationship and reasonably strong exposure to the client's operations. The time periods chosen were largely the result of discussions with practitioners during the audit case selection, formulation and pilot study phases of this project.

The company designated as "stable" demonstrates no discernible pattern of growth and little variance in earnings per share, return on assets, and return on equity over the five year period presented. The "growth" company showed a 12% compounded annual growth rate in earnings per share over the same period. Both firms had the same total earnings per share during the five years; the "growth" firm merely started at a lower level and

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[4]For example, see Robertson (1976) pp. 169-170.

displayed the indicated upward earnings trend, while the "stable" corporation experienced relatively constant earnings. The selection of 12% as indicative of a "growth" firm is based on an average rate of growth of about 8% for all companies in the Fortune 500 over the 1967-77 period. Only 25% of these corporations had a growth rate equal to or exceeding 12% over this period, and only a handful demonstrated such a consistent upward trend in earnings. Therefore, it is evident that the combination of a twelve percent annual growth rate, which significantly surpasses the mean rate for the largest companies, and a constant growth pattern would most likely be construed as "strong growth."

Experimental Design

Using the notation of Campbell and Stanley (1963), the basic experimental design of this study is depicted below:

R	X_1	O_1
R	X_2	O_2
⋮	⋮	⋮
R	X_n	O_n

Where: R = random assignment of subjects

X = treatment group

O = observation

This design is considered to be a "true" experimental approach by Campbell and Stanley due to its inherent strong controls for internal and external validity as compared to "pre-experimental" or "quasi-experimental" designs (p. 6-42). The design is referred to as the "posttest-only, control group design."

The advantages of the posttest-only, control group design is its strong control over extraneous variables through randomization and its testing efficiency. This efficiency occurs since only one test is administered, reducing the time required of subjects. The design is also preferred where a pretest and posttest is awkward. This advantage of greater efficiency is especially important to this study. The primary subjects are auditors at high staff levels. There is only limited time availability of such subjects at the experimental setting (professional meetings) selected; it is reasonable to anticipate that the maximum time a subject can be expected to willingly and enthusiastically participate is perhaps only 20-30 minutes. It is also quite awkward to administer and control a pretest and posttest at such meetings. Professional meetings were selected for the advantages discussed earlier, i.e., greater representation of higher staff members and of firms of varying sizes. However, it is believed that regardless of the approach employed, e.g., field study, survey, in auditing

research limited availability of practitioners is always a problem due to the great pressures placed on the time of CPA s.

The major weakness of the posttest-only control group design employed is the lack of a pretest as used in other true experimental approaches. The pretest helps insure that subjects in the various experimental groups were initially not significantly different in attributes to have led to the results received. However, the random assignment of subjects largely minimizes this weakness.

> While the pretest is a concept deeply embedded in the thinking of research workers in education and psychology, it is not actually essential to true experimental designs. For psychological reasons it is difficult to give up "knowing for sure" that the experimental and control groups were "equal" before the differential experimental treatment. Nonetheless, the most adequate all-purpose assurance of lack of initial biases between groups is randomization. Within the limits of confidence stated by the tests of significance, randomization can suffice without the pretest. (Campbell and Stanley, p. 25).

Additionally, the background information solicited from CPA s such as professional experience, size of CPA firm, provides data on significant intervening variables that appear to substantially affect audit judgments. These demographic variables are employed in an analysis of covariance, to be discussed, to control for such variables in a manner very similar in theory to a pretest. As Campbell and Stanley note:

> However, covariance analysis and blocking on "subject variables" (Underwood, 1957) such as prior grades, test scores, parental occupation, etc. can be used, thus providing an increase in the power of the significance test very similar to that provided by a pretest. Identicalness of pretest and posttest is not essential. Often these will be different forms of "the same" test and thus less identical than a repetition of the pretest. The gain in precision obtained corresponds directly to the degree of covariance, and while this is usually higher for alternate forms of "the same" test than for "different" tests, it is a matter of degree, and something as reliable and factorially complex as a grade point average might turn out to be superior to a short "pretest." (p. 26).

Figure 5 presents an overview of the full research design. The design is a 2X2X2 Factorial analysis of variance (ANOVA); the factors are the environmental variables (independent variables) of:

(1) client size;

(2) length of client association; and

(3) growth pattern of client.

Therefore, there are eight (cells) variations of each case. Subjects are randomly assigned to one of the eight experimental groups <u>for each case</u>. Thus, a subject would be expected to be placed in a different treatment group for the McAllister, Inc. and Winslow Company cases.

To insure that the <u>order of presentation</u> of the cases is not an intervening variable, the cases are randomly sorted. This randomization was accomplished by periodically (every fifteenth "package") flipping a coin to decide which case came first and then alternating

FIGURE 5

RESEARCH DESIGN: 2X2X2 FACTORIAL ANOVA

Client Size	Stable Firm		Growth Firm 12% Annual Growth	
	Term of Association		Term of Association	
	Short 2/3 Years	Long 11/13 Years	Short 2/3 Years	Long 11/13 Years
Medium Size				
Large Size Fortune 500 Co.				

NOTE: Dependent Variable: Audit decision on required disclosure for an "audit error," i.e., adjustment, qualified opinion (McAllister), or footnote.

the order on each package thereafter. A package is the set of materials each subject would receive, i.e., Instructions, Winslow Case, McAllister Case, Biographical Questionnaire. In this manner, the order of the cases can be expected to be random. The key research question is whether audit judgments are significantly different among the experimental groups, suggesting that environmental cues are heavily relied upon by auditors in the decision setting provided.

Replication of Experiment

As discussed in Chapter III, there have not been any studies investigating the suitability of students as surrogates for CPA s in auditing research. The main experiment is replicated with auditing students as subjects for comparison to the responses of CPA s. The findings provide evidence as to whether there is significant loss in external validity in utilizing student surrogates (Hypothesis 7) for the decision setting at hand.

Auditing students are selected as subjects, since it is believed that they would be the closest surrogates in educational background to practitioners. Such students have had some exposure to auditing standards, ethics, and procedures and have had occasion to evaluate audit situations/decisions faced in practice. Student

participants were enrolled in auditing courses during the summer session 1978. Subjects were from four audit classes: three classes from California State University, Los Angeles, and one class from California State University, Fullerton. All classes were at or had passed two-thirds of the term. Therefore, all students had been exposed to several of the concepts and techniques in auditing and were familiar with the nature of the audit process. With this academic background in auditing these subjects appear to be the closest student surrogates to practitioners available. If these auditing students are found to arrive at decisions that significantly differ from CPAs, it is doubtful that other students unfamiliar with the field of auditing would fare better as surrogates. Students were randomly assigned to the experimental groups and received the identical instructions, cases, and completion time as their "real world" counterparts.

Pilot Study

Audit cases were submitted to twenty-four subjects for the pilot study, placing three respondents in each of the eight treatment groups. Because the subjects were comprised of accounting faculty members (nineteen) and doctoral students (five) with busy, conflicting time schedules, it was considered most

expedient to ask participants to complete the cases at their convenience rather than administering the experiment to all respondents at one setting. However, since the purposes of a pilot are to discover problems, omissions and ambiguities in the test instrument and not to gather valid findings, this self-administered approach is appropriate. Subjects were randomly assigned to the treatment groups on each case. Participants were requested to complete the cases independently and in one time period; comments and suggestions were solicited. Subjects were also asked to indicate the time required for completion of the cases. Fourteen responses were received for analysis: nine accounting faculty members and five doctoral students. All but two subjects were CPA s, thus, virtually all had had public accounting experience of varying amounts. The data from the pilot was statistically analyzed as preparation for the actual experiment. The findings are not statistically valid due to the small sample size and, therefore, are not presented.

Participants received three audit cases: the Winslow Company and McAllister, Inc., cases already described and the "Longhorn Company." The latter case involves a decision as to whether to capitalize a lease between related parties with reference to FASB Statement No. 13, "Accounting for Leases."

The following alterations were made to the test instrument as a result of the pilot and consideration of comments from five CPA managers/partners reviewing the cases:

(1) the Longhorn Company case was abandoned;

(2) additional information was added to the cases; and

(3) numerous minor changes in format and wording were made.

The Longhorn case was deleted for two reasons: (1) time constraints; and (2) the highly technical nature of the issues involved. Respondents indicated an average completion time of 10-15 minutes per case. Requesting subjects to examine all three cases would, thus, require 45 minutes, an excessive time period to appendage to a professional meeting. Contacts with chairmen of various committees of the California Society of CPA s confirmed that it would be difficult to obtain cooperation for such a lengthy experiment.

Comments from several subjects in the pilot also indicated the belief that it was unreasonable to expect CPA's to respond to a case as technical as the proper treatment of leases without the aid of copies of the standards and principles at issue. The CPA s in practice consulted stated that they would normally consult the professional pronouncements in such matters;

decisions made without such pronouncements would not be indicative of those made in practice. Providing auditors with the standards would be cumbersome, add to the completion time, and may produce the belief that the experiment is a test of their knowledge of the formal principles. The accounting issues, however, provide only a setting for the experiment and are only a tangental issue in this study. The other cases were believed to involve fundamental, less technical accounting matters. As a result of all of the above considerations, the test instrument was reduced to the two audit cases discussed earlier. The estimated completion time is, thus, about 20-30 minutes.

The information in the McAllister, Inc., case (land write-down) was considered sufficient for the audit decision requested. However, repeated comments from participants indicated three significant facts were missing from the Winslow Company case, whether:

(1) delivery of all tapes had been made;

(2) payment had been received; and

(3) the return provision was a formal clause in the sales contract or merely a verbal understanding.

Since the environmental factors and <u>not</u> the hard cues (e.g., delivery of tapes) are the focus of this study, the above matters are not of direct consequence, as long

as the decision setting is realistic. All subjects receive the same hard cues and accounting issues; only the environmental cues are manipulated to examine their impact on decision-making. After consulting with accounting faculty participating in the pilot and the professional standards, it was decided to indicate:

(1) the tapes were delivered;

(2) payment in full was received; and

(3) the return provision is a contractual agreement.

The delivery of the tapes should be irrelevant; delivery would not dictate whether or not a consignment sale occurred. In a consignment and a normal sale, delivery is made. Payment of amounts due should not be significant either, since it is the return provision that is the major uncertainty. Specifying that the provision is contractual makes the decision a difficult one; it is believed that if it were not a clause of the sales agreement, the transaction would be less controversial and viewed by most as a sale. However, it is important to emphasize once more that all auditors receive the same decision setting and facts. Only the environmental variables are varied. Thus, there is no a priori reason to believe that CPA s randomly assigned to the experimental groups would per se arrive at significantly different audit decisions. Therefore,

any such differences found would appear to be as a result of the impact of environmental factors.

As noted, several other alterations were made in wording and format from comments received during the pilot. There were none significant enough to be noted.

Statistical Analyses

The statistical approaches employed to examine the impact of environmental factors on audit decisions are analysis of variance (ANOVA) and analysis of covariance. The covariates are the demographic variables described earlier (e.g., age, professional experience) and are introduced to take into account any initial differences between the experimental groups on potentially major attributes that may affect audit judgments. Considering such variables helps to remove extraneous factors, thereby increasing measurement precision as to the significance of the key variables of interest (environmental cues). As discussed before, an analysis of covariance serves essentially the same purpose as a pretest.

Kerlinger (1973, pp. 257-258) notes three major advantages of utilizing ANOVA:

> One, it enables the researcher to manipulate and control two or more variables simultaneously. . .
>
> A second advantage of the factorial approach (is that) variables that are not manipulated can be

> controlled. . . We can "control" them by building them into the research design. Not only can they be controlled; they can yield information of possible value and significance.
>
> A third advantage is that factorial analysis is more precise than one-way analysis. . .
>
> The final advantage -- and, from a scientific viewpoint, perhaps the most important one -- is the study of the interactive effects of independent variables on dependent variables.

The last advantage noted (the ability to examine interactive effects) is important. The interaction of environmental factors may be significant in this study, e.g., the audit decisions of CPA may be greatly influenced in an engagement of a client that is both large and has experienced strong growth. Findings on such interactive relationships provide evidence to test hypothesis 2.

The use of ANOVA presents two problems in this study:

(1) ANOVA requires the dependent variable to be measured on at least an interval scale (Nie et al, 1975, p. 399); and

(2) If there are unequal numbers of subjects in the cells of the design, the orthogonality of the factors is impaired.

The dependent variables (audit decisions) are on a seven point Likert-type scale. The intervals are assumed to have equal distances between them. The decision choices are strictly and fundamentally on an ordinal scale.

However, as Guilford (1956, p. 15) states, it is quite common for researchers in the behavioral sciences to make the assumption of an interval scale for data analysis. ". . .(E)xperimental data often approach the condition of equal units sufficiently well that there is tolerable error in applying the various statistics that call for them." Guilford points out that the researcher must, however, be careful in using and evaluating the results of such tests when the assumption of equal intervals is unreasonable or unjustified.

Kerlinger (1973) also believes that the researcher often faces a dilemma in collecting data on Likert-type scales. On the one hand, if statistical analyses requiring interval or higher level data are performed, there is a chance of obtaining erroneous results. On the other hand, if such analyses are not employed, fundamental relationships may not be detected, Kerlinger concurs with Guilford: "The best procedure would seem to be to treat ordinal measurements as though they were interval measurements, but to be constantly alert to the possibility of gross inequality of intervals" (p. 439). The scales of the audit decision in the test instrument were carefully worded and submitted for scrutiny to practitioners and participants of the pilot to produce a range of distances perceived to be as equal as possible.

The problem of unequal cell sample sizes is not significant in an experimental setting such as this where the cells approach equality. There are several mathematical adjustment procedures available to deal with unequal cell sizes (Nie et al, 1975, pp. 405-408). Kerlinger notes that: "When doing experiments, the problem is not severe because subjects can be assigned to cells at random . . . and the n's kept equal or nearly equal" (p. 268).

After the audit decisions of CPA s are analyzed and corresponding frequency distributions constructed, the responses of auditing students and practitioners are compared. A T-Test is employed to examine if there is a significant difference in the decisions of auditors and students on the cases. If students are strong surrogates for CPA s, it is anticipated that the distribution of student judgments would be substantially similar to that of practitioners. The T statistic is employed to confirm or refute hypothesis 7, conjecturing that auditing students are poor substitutes for CPA s in arriving at the high level, professional decisions dealt with in this study.

The Statistical Package for the Social Sciences (SPSS) computer programs are used to perform the statistical analyses and computations noted above (Nie

et al., 1975). A "significant" difference is defined as $\alpha \leq .10$.

Limitations and Problems

This research study faces three major methodological limitations/problems:

(1) Do the audit cases provide a setting that is a reasonably close surrogate for an actual audit engagement?;

(2) Are the environmental factors (independent variables) selected for study among the major ones, if any, employed in practice?; and

(3) Are the types of audit decisions examined ones in which CPA s would commonly rely on environmental cues? or are there other types of judgments that better typify such reliance?

The first problem noted deals with difficulties in external validity. In making the types of difficult, complex decisions presented in this study in actual practice, the auditor often faces significant trade-offs and pressures. The CPA is aware of his societal role and obligations and the legal risks involved. However, the practitioner may also encounter vociferous objections from the client; a good client rapport provides a more

effective and efficient working arrangement for both parties. Thus, it is not unreasonable to expect the auditor to be concerned with maintaining, as best as possible, strong client relations. The practitioner may also be to some extent economically dependent upon the audit fees from the engagement and fear loss of the client over an issue. The Metcalf Report asserted that such dependence prevents the accounting profession from being truly independent in audit engagements and in the formulation of auditing and accounting principles. The major experimental question is whether audit cases can be a realistic surrogate for an actual engagement where the pressures and considerations noted above are present.

Of course, the optimal research approach would be to examine actual audit decisions in practice. Unfortunately, as noted before, such an approach does not appear to be feasible due to client confidentiality, the substantial amount of time required to complete such a project, and significant internal validity problems. The audit cases in this study are taken from practice and were carefully reviewed and revised to insure proper realism. Additionally, there are client pressures and other considerations presented (e.g., an initial stock offering) that are indicative of those encountered in an actual audit. It appears that the cases are as close a simulation to an engagement as possible in an

Auditors make several judgments during an engagement, e.g., the allocation of audit time, the determination of the upper precision error rate in compliance testing. It is difficult at this point to determine what decision context will best provide a setting in which auditors may utilize heuristic biases. Disclosure/materiality decisions are examined in this study, since such judgments are highly subjective and client dependent. The findings of the studies performed by Pattillo (1976; 1974) and Woolsey (1973) indicate a wide variation among subjects in materiality criteria; this exemplifies the subjective nature of this audit judgment. The cases employed appear to involve complex information processing and afford the opportunity to determine whether environmental biases occur.

Summary of Research Methodology

The primary approach of this study is a laboratory experiment; this approach was selected over others (e.g., surveys, field experiments) due to the strong control offered of extraneous variables (internal validity) and cost/time feasibility. Three additional factors were unique considerations relating to the research issue at hand:

(1) the degree of decision rule self-insight of auditors;

(2) the potential sensitive nature of questions in this area, possibly preventing a subject from being completely objective in his responses; and

(3) limitations as to availability of actual audit working papers due to client confidentiality.

The first two factors above lead to serious questions as to the validity of a survey study on the research subject; the last one greatly limits the feasibility of a field experiment.

The overall research design is a 2X2X2 Factorial ANOVA; the factors are the environmental cues of client size, growth pattern, and length of association with the auditor. The dependent variables are audit disclosure decisions on two disguised case situations where a proposed audit adjustment is at issue. An analysis of covariance is also performed to control for any initial differences among the experimental groups and essentially acts as a pretest. The covariates are various background attributes of subjects (e.g., audit experience, education) that may be significant intervening variables. Subjects are practicing CPA's attending a professional meeting; this setting is expected to provide respondents that represent a cross-section of firms of various sizes and are at higher staff levels. Participants are randomly

assigned to the treatment groups. The major research question is whether auditor responses will significantly differ among experimental groups suggesting the important impact of environmental factors on audit decisions. The direction of any such differences is also of major concern, e.g., did the subjects make judgments tending to favor large firms? growth companies?

The experiment is replicated with auditing students as subjects. This extension of the main experiment endeavors to determine the appropriateness of students as surrogates for practicing CPA s in auditing research. The findings of this replication may provide valuable guidance for future research to evaluate the loss in external validity of using students and to analyze past research employing such surrogates.

Three limitations of the research methodology are cited:

(1) the case decisions may not properly simulate an actual audit;

(2) the type of audit judgment investigated (disclosure/materiality) may not be representative of CPA reliance on environmental variables; and

(3) the environmental factors (independent variables) selected may not be among the most significant environmental cues utilized.

The first limitation appears to be minimized due to careful measures taken to insure the realism of the cases. The settings are taken from actual practice and were revised from comments of practitioners reviewing the case and pilot study participants. Responses from these individuals indicated the cases are indicative of those encountered in practice.

The last two limitations occur because of the early stage of the research on this issue. The type of audit decision chosen is a complex, high level judgment. The HIP research reviewed earlier showed the common use of heuristic biases by decision makers facing such difficult information processing situations. Thus, the judgment studied (disclosure/materiality) appears to be an excellent backdrop to examine environmental biases, if any, of auditors. The environmental factors selected were those frequently alleged in the professional literature to affect CPA decisions. The a priori manner of the approach employed to choose the independent variables and decision setting for the experiment appears to be the most viable method available at this stage of the research. Later experimental findings will enable the researcher to more efficiently focus on factors and audit judgments that apparently demonstrate the heavy reliance on environmental cues by auditors.

This study is viewed as one of the first links in a succession of research projects on the influence of environmental factors on audit decisions.

CHAPTER V

EXPERIMENTAL FINDINGS

The purpose of this chapter is to present the results of this empirical study. The first section contains data on the number and backgrounds of the subjects. The findings of the hypothesis tests are then examined and briefly discussed. Additional results of interest are noted relating to the variability of responses of CPAs and the impact of various demographic factors on audit decisions. The last part of the chapter contains a concise summarization of the major findings.

An Overview of the Subjects in the Experiment

Table 1 provides a synopsis of various demographic data on the CPAs in the experiment. Sixty-three practitioners participated in the study. As Table 1 indicates, subjects possessed considerable diversity in background attributes. The largest number of individuals in an age category was from 30-35 (38% of respondents), however, subjects were almost evenly dispersed in the age groups over 25. A noteworthy fact is that 76% of the CPAs had more than five years of audit experience, indicating a group of subjects with generally extensive

TABLE 1

DEMOGRAPHIC DATA ON PRACTITIONERS (n = 63)

Demographic Variable	Level	% of Subjects* Responding
Age	Under 25	3%
	25-29	13
	30-35	38
	36-40	10
	41-45	7
	46-50	14
	51-55	5
	Over 55	10
	Total	100%
Audit Experience	Less than 5 years	24%
	6-9 years	23
	10-13 years	24
	14-17 years	7
	over 17 years	22
	Total	100%
CPA Firm Size	National firm major city office	38%
	National firm satellite office supervised by a major city office	0
	National firm independent non-major city office	2
	Regional firm office	9
	Local firm office	46
	Not applicable (e.g., not in current practice)	5
	Total	100%
Staff Position	Staff accountant	9%
	Senior accountant with little supervisory experience	5
	Senior accountant with substantial supervisory audit experience	7
	Supervisor (or equivalent position)	19
	Partner	53
	Not Applicable	7
	Total	100%

TABLE 1 continued

Demographic Variable	Level	% of Subjects* Responding
Academic Degrees (Highest Degree)	Bachelors degree	74%
	Masters degree	23
	Other	3
	Total	100%
Firm Membership in Sec Practice Division	Yes	54%
	No	39
	Not applicable	7
	Total	100%
Areas of Specialization	Audit	68%
	Tax	14
	Management advisory service	2
	Other	16
	Total	100%

*Excludes missing data on five subjects.

professional background. Such a group can be anticipated to have broad exposure to the complex audit decisions examined in this study.

CPA firm size affiliation revealed a dichtomy, practitioners were, for the most part, either employed with a national (40%) or local (46%) firm. This split is valuable in testing hypothesis 5 as to the impact of firm size on the reliance of environmental cues. Consistent with the extensive experience of subjects, respondents generally held higher staff positions;

seventy-two percent were at the supervisor or partner level. Approximately three-fourths of the practitioners possessed the bachelors degree as the highest educational level attained.

Firm Membership in the SEC Practice Division was virtually divided among respondents. The majority (54%) of the subjects were affiliated with firms that were members of the Division. Two-thirds of the CPAs indicated auditing as their area of specialization. An analysis of those specifying the category of "Other" ($n = 9$) revealed all had over 5 years of audit experience, four having had over 14 years of experience. Additionally, three individuals specializing in tax had over ten years of audit exposure. Thus, approximately 89% of the subjects considered auditing to be their major area of concentration or had substantial audit experience.

A major methodological decision to consider was whether to include in the statistical analyses the judgments of CPAs specifying an area of expertise other than auditing. To resolve this dilemma, a t-test and chi-square test were performed comparing the responses of these subjects to judgments of practitioners specializing in auditing. Table 2 presents the results of these analyses, indicating no substantial difference in judgments. This finding is consistent with the generally extensive audit experience of virtually all subjects as

TABLE 2

ANALYSIS OF RESPONSES BY AREA OF SPECIALIZATION
(Audit vs. Other)

Dependent Variable	Mean Response* Audit (n=38)	Mean Response* Other (n=19)	T-Test T Value	T-Test df	T-Test Significance	X^2 Test X^2 Value	X^2 Test df	X^2 Test Significance
Audit Decisions:								
McAllister, Inc.:								
Audit Adjustment	3.74	4.43	-1.19	54	NS	5.92	5	NS
Footnote Disclosure	4.37	3.68	1.14	54	NS	5.07	6	NS
Qualified Opinion	5.06	5.45	-0.71	54	NS	6.04	6	NS
Winslow Co.:								
Audit Adjustment	3.74	3.58	0.28	55	NS	7.60	5	NS
Footnote Disclosure	4.39	4.68	-0.49	54	NS	12.43	6	0.05
Cue Weighting:								
McAllister, Inc.:								
Materiality	2.11	2.34	-0.66	55	NS	7.02	5	NS
Client Objections	4.95	4.44	1.64	53	NS	6.16	4	NS
GAAP	2.06	1.83	0.71	52	NS	4.96	5	NS
Winslow Co.:								
Materiality	2.95	2.43	1.41	54	NS	14.40	5	0.01
Client Objections	4.47	4.39	0.22	53	NS	3.96	5	NS
GAAP	2.06	1.89	0.53	54	NS	5.85	4	NS

*Response Scales:

Dependent Variable	SCALE RANGE Numerical	Description
Audit Decisions	1-7	Yes - No
Cue Weighting	1-6	Most significant factor-Insignificant

NOTE: $p \leq .10$

noted earlier and the nature of the committees and/or meetings in which subjects were selected from, e.g., one of the meetings attended was the Los Angeles Accounting Principles and Auditing Standards Committee. Such meetings are expected to attract individuals with strong backgrounds and interests in auditing. Based on these findings, the responses of all participants are included in the final analyses.

Overall, the subject demographic data presented reveals a diverse group of participants that appears to portray a representative cross-section of practitioners at the higher staff levels. This cross-section should add to the external validity of the study and, therefore, to the validity and richness of the findings.

In addition to the practitioners, ninety-six auditing students served as subjects to test the suitability of students as surrogates for CPAs in auditing research, Hypothesis 7. The students were taken from four summer classes as follows:

	Number of Subjects
California State University, Los Angeles:	
Early morning class	25
Mid-morning class	21
Night class, Mondays	25
California State University, Fullerton:	
Night class	25
Total	96

All of the classes were sections of the undergraduate, senior level auditing course usually taken by accounting majors intending to enter the profession.

Results of Hypothesis Tests

The major thrust of the study entails empirically testing the seven central research hypotheses posited earlier. The test results will now be discussed for each of the hypotheses.

Hypothesis 1: Audit judgments are significantly affected by environmental factors.

The case situations involve two major decisions:

(1) Whether an audit adjustment is necessary, and

(2) Whether footnote disclosure is sufficient.

Additionally, the McAllister, Inc. case requires respondents to determine if a qualified opinion would be appropriate. A separate three-way analysis of covariance with five covariates was conducted for each decision. The covariates (demographic factors) are:

(1) age;

(2) audit experience;

(3) CPA firm size;

(4) staff position; and

(5) academic degrees.

After an analysis of the frequency distributions of the covariates, the covariate data were recoded to

combine levels with insignificant numbers and capture the underlying nature of the data, i.e., greater parsimony. For example, CPA firm size, as discussed earlier, demonstrated two basic groups: national and local firms. Accordingly, the data was recoded to combine the five levels into two. See Appendix B for a detail listing of the data modifications performed. The analyses of covariance were performed with the recoded data.

Table 3 provides summary statistics (mean, standard deviation) on the audit judgments of subjects in both cases. The results of the analyses of co-variance are presented in Tables 4 and 5. The findings do not support the hypothesis, since the main effects and interactions do not explain a significant proportion of the variation in audit decisions. It appears that CPAs in this experiment do not rely substantially on the environmental cues studied in arriving at audit judgments.

Hypothesis 2: There are substantial differences in the weighting placed on various environmental cues. Additionally, the interaction of cues has an important impact on audit decisions.

As noted before, the findings suggest that none of the environmental factors or interactions significantly impact audit decisions. However, by examining the F Values in Tables 4 and 5 the relative importance of each cue and interaction in explaining the variation in judgments can be discerned. All cues and interactions

TABLE 3

SUMMARY DECISION STATISTICS

Judgment	Mean Response*	Standard Deviation
Audit Decisions:		
McAllister, Inc.:		
Audit Adjustment	4.29	2.03
Footnote Disclosure	3.77	2.11
Qualified Opinion	5.32	1.87
Winslow Co.:		
Audit Adjustment	3.73	1.99
Footnote Disclosure	4.39	2.15
Cue Weighting:		
McAllister, Inc.:		
Materiality	2.25	1.26
Client Objections	4.61	1.08
GAAP	2.12	1.26
Winslow Co.:		
Materiality	2.58	1.29
Client Objections	4.43	1.28
GAAP	2.02	1.12

*Response Scales:

	SCALE RANGE	
Judgment	Numerical	Description
Audit Decisions	1-7	Yes - No
Cue Weighting	1-6	Most significant factor-Insignificant

TABLE 4

ANALYSIS OF COVARIANCE:
AFFECT OF ENVIRONMENTAL FACTORS ON AUDIT DECISIONS

Source of Variation	df	MCALLISTER, INC. CASE Adjustment Decision MS	F	P*	Footnote Disclosure MS	F	P*	Qualified Opinion MS	F	P*
Covariates	5	9.158	2.488	0.049	7.568	1.713	NS	2.966	0.793	NS
Main Effects:										
Client Size (A)	1	0.545	0.148	NS	2.253	0.510	NS	1.066	0.285	NS
Association (B)	1	0.887	0.244	NS	3.888	0.880	NS	2.544	0.680	NS
Growth Pattern (C)	1	0.035	0.010	NS	0.136	0.031	NS	0.018	0.005	NS
Interactions:										
A X B	1	0.785	0.213	NS	0.639	0.145	NS	8.885	0.966	NS
A X C	1	3.013	0.818	NS	1.744	0.395	NS	0.782	0.209	NS
B X C	1	0.163	0.044	NS	2.645	0.598	NS	2.245	0.600	NS
A X B X C	1	4.952	1.345	NS	0.942	0.213	NS	1.954	0.523	NS
Within Groups	36	3.681			4.419			3.739		
TOTAL	48									

*$p \leq .10$

TABLE 5

ANALYSIS OF COVARIANCE:
AFFECT OF ENVIRONMENTAL FACTORS ON AUDIT DECISIONS
Winslow Co. Case

Source of Variation	df	Adjustment Decision MS	F	P*	Footnote Disclosure MS	F	P*
Covariates	5	5.219	1.311	NS	11.478	2.841	0.029
Main Effects:							
Client Size (A)	1	0.257	0.064	NS	1.080	0.267	NS
Association (B)	1	2.705	0.679	NS	0.655	0.162	NS
Growth Pattern (C)	1	1.251	0.314	NS	0.774	0.192	NS
Interactions:							
A X B	1	0.012	0.003	NS	0.667	0.165	NS
A X C	1	4.830	1.213	NS	0.968	0.240	NS
B X C	1	0.155	0.039	NS	3.298	0.816	NS
A X B X C	1	0.033	0.008	NS	4.100	1.015	NS
Within Groups	36	2.916			4.041		
TOTAL	48						

*$p \leq 0.10$

represent one degree of freedom (df). An attempt is, thus, made to establish a pattern across the two cases. For all decisions, except the footnote disclosure judgment in the Winslow Company case, the length of Association variable had the greatest significance of the main effects, followed by the size of the client. Unfortunately, the interactive effects explain approximately the same proportion of the variation as the main effects, and the significant interactions vary for each judgment. The results are, thus, conflicting and do not provide a clear indication of the relative weighting of the environmental cues. Reliance on these cues appears dependent on the nature of the decision at hand.

Hypothesis 3: Auditors lack self-insight as to the significant reliance placed on environmental factors.

This hypothesis deals with the degree of self-insight of auditors into their decision rules. Since the findings presented suggest that environmental cues do not have a substantial influence on audit decisions, auditors would display proper insight if they infrequently mention reliance on such factors in the open-ended question of the test instrument. Hypothesis 3, thus, implicitly assumes Hypothesis 1 is true and is thus predicated on the empirical validation of the first hypothesis, i.e., auditors rely heavily on environmental factors. The results, therefore, essentially invalidate

Hypothesis 3 as stated. However, it is still valuable to determine whether subjects demonstrate proper insight in this area by recognizing the apparent limited reliance on environmental cues. Additionally, examining the perceived cues utilized is worthwhile, thus, providing insight into the judgment process of CPAs on the subjective, difficult audit decisions investigated in this study.

Table 6 indicates the frequency of the various reasons cited for the audit decision arrived at in each of the two situations. This table is tabulated from a content analysis of the responses given to the following open-ended question at the end of each case:

> "Briefly describe your reasoning for the audit indicated in the case."

To establish categories for the coding of responses, a random sample of fifteen subject replies was drawn. From these responses a list of referenced cues was compiled for each case, providing a tentative coding scheme. Responses of all auditors were then classified according to the initial scheme. Reasons mentioned that had not been encountered before were added as new categories to the list. To test the reliability of the content analysis, all replies were re-coded without reference to the earlier classification. Only twelve "errors" (discrepancies) were discovered; an error rate

TABLE 6

CUES MENTIONED (REASONS NOTED)
IN ARRIVING AT AUDIT DECISION

Cue Relied Upon	% of Subjects Noting Cue Reference
McAllister Inc: (Land Writedown):	
Uncertainty of Rezoning Efforts	55%
Materiality	47%
Generally Accepted Accounting Principles	20%
Other	20%
Conservatism	16%
Difficulties in Measuring the Loss	11%
Environmental Factors (Growth Trend, etc.)	9%
Prior Failures to Obtain Rezoning	7%
Proper Role of Financial Statements	7%
Winslow Co.: (Revenue Recognition: Interpretation of Sales Return Provision):	
Materiality	40%
Feasibility of Establishing An Allowance for Estimated Returns	23%
Completion of The Earnings Process	21%
Substance of the Transaction	18%
Client Arguments	16%
Existence of a Contractual Return Clause	16%
Client Manipulation of Income for New Stock Issue	14%
Environmental Factors	14%
Slow Present Sales Rate of Tapes	12%
Unusual Nature of the Transaction	11%
Other	11%
Cash Receipt on Sale	9%
Legal Risk on CPA	7%
Generally Accepted Accounting Principles	7%
Strong Probability of Returns	4%
Difficulty in Reselling Tapes	4%

of about 10%. Some of these errors resulted from vagueness of the subject's reply. In lieu of this low error rate, the coding scheme employed appears to have a high level of reliability. Because this content analysis is not considered to be a vital phase of the study, the above test for reliability was considered sufficient without additionally engaging another individual to conduct the re-coding.

Table 6 reveals that there were a large number of perceived cues used by subjects in making decisions on the two experimental cases. Several CPAs noted multiple reasons for their judgment.

Number of Cues Mentioned	McAllister, Inc. % of Subjects	Winslow Co. % of Subjects
One	38%	19%
Two	31	37
Three or More	31	44
	100%	100%

Generally the various cues in each case were relied upon with approximately equal frequency. Materiality was identified as a significant cue in both cases. This result is expected since each decision involved a dual materiality/disclosure decision. The materiality level of the audit adjustments in question were set at the lower end of the range frequently indicated by CPAs in prior survey research studies, i.e., 5-10% of net income.

Uncertainty of rezoning was the cue most often referred to in the McAllister, Inc., case. Except for materiality there was not a heavy reliance on any one or two cues in the Winslow Co. case. Respondents displayed great dispersion in the cues mentioned. In summary, CPAs appeared to consciously rely on several cues. The cues within each case were for the most part equally weighted with the exceptions of materiality and uncertainty of rezoning (McAllister, Inc.).

Consistent with the results on Hypothesis 1, CPAs indicated relatively low reliance on environmental cues in their decision making. Only 9% and 14% of the respondents on the McAllister, Inc. and Winslow Co. cases respectively mentioned such cues as an important reason for their decision. Subjects, thus, demonstrated good self-insight as to the low reliance on environmental cues, and Hypothesis 3 is rejected. The most frequently cited environmental factor was growth trend of the firm.

Hypothesis 4: The weighting placed on a hard evidence cue is materially affected by the existence of environmental factors.

This hypothesis posits that there is an inter-relationship in the reliance placed on hard evidence and environmental cues. To test this assertion, subjects were asked to evaluate the weight placed on three "hard evidence" cues in making their decision. This weighting

scale ranged from "the most important factor" to "insignificant or irrelevant" (6 point scale). The three cues were:

(1) Materiality;

(2) Objections of the client; and

(3) Generally accepted accounting principles.

This weighting of each hard evidence cue is treated as an additional respondent judgment. A three-way analysis of covariance (ANCOVA) with five co-variates was conducted for each cue. The dependent variable is the cue weighting; the independent variables are the three environmental factors studied. The co-variates were the same as those utilized earlier to test Hypothesis 1.

Table 7 provides the summarized results of these analyses. Hypothesis 4 appears to be supported since the perceived reliance on virtually all of the three hard evidence cues is significantly ($p \leq .10$) affected by the environmental factors. Unfortunately there is not an apparent pattern across the cases of this affect. The relationship between the hard evidence and environmental cues appears to be complex and situation specific.

Table 8 indicates the mean hard evidence cue weighting for each level of the environmental factor when significant interactions are not present. The data suggests that greater conscious weight is placed on materiality and accounting principles for a large client

TABLE 7

RESULTS OF ANALYSES OF COVARIANCE: EFFECT OF ENVIRONMENTAL FACTORS ON WEIGHTING OF HARD EVIDENCE CUES

Hard Evidence Cue	Environmental Factor(s)	F	Significance
McAllister, Inc.:			
Materiality	Client Size	3.747	.061
	Length of Association	4.168	.049
Client Objections	Client Size	2.823	.100
	Size X Growth	3.273	.079
Accounting Principles	Client Size	3.280	.078
Winslow Co.:			
Client Objections	Growth Pattern	4.162	.049
	Size X Association	3.310	.077
Accounting Principles	Growth Pattern	3.441	.072

NOTE: Only significant ($p \leq .10$) results are presented. df = 1 for all factors and interactions; df = 36 and 37 for within-group variance for McAllister, Inc. and Winslow Co. cases respectively.

TABLE 8

MEAN CUE WEIGHTING AS A FUNCTION OF ENVIRONMENTAL FACTORS: SIGNIFICANT MAIN EFFECTS ONLY

Hard Evidence Cue	Environmental Factor(s)	Mean Cue Weighting ($\bar{x}$) Level 1	Level 2
McAllister, Inc.:			
Materiality	Client Size	1.96	2.73
	Length of Association	2.78	1.91
Accounting Principles	Client Size	1.64	2.25
Winslow Co.:			
Accounting Principles	Growth Pattern	2.31	1.67

NOTE:

Environmental Factor	Level 1	Level 2
Client Size	Large	Medium
Length of Association	11-13 Years	2-3 Years
Growth Pattern	Growth	Stable

than a medium-sized client. Materiality appears to be less significant for a long-time client, while accounting principles are given less weight for a growth firm.

To intepret the significant interactions discovered, Table 9 presents the mean cues weighting for each experimental group of interest. The subjective weighting of the Client's Objections displayed a significant interaction in both cases. All groups indicated a low mean weighting of this hard evidence cue. This is to be anticipated, since auditors are trained to regard such internal information as the least credible and persuasive form of evidence. For example, Robertson (1976, p. 165) lists five types of evidence (in descending order of relative strength):

(1) Mathematical;

(2) Physical observation;

(3) External evidence;

(4) External-internal evidence; and

(5) Internal evidence.

Table 9 indicates that in both cases the objections of a medium-sized client are considered less significant than those of a large client. This suggests a heuristic bias against smaller clients. The apparent greater reliance and consideration of management viewpoints by auditors of larger concerns is a great advantage to such clients in influencing audit judgments

TABLE 9

MEAN CUE WEIGHTINGS FOR EXPERIMENTAL GROUPS: ANALYSIS OF SIGNIFICANT INTERACTIONS

Hard Evidence Cue: Client Objections

McAllister, Inc.:

	Growth Pattern	
Client Size	Growth	Stable
Large	4.429	4.445
Medium	4.500	5.154

Winslow Co.:

	Length of Association	
Client Size	11-13 Years	2-3 Years
Large	4.235	4.500
Medium	4.286	4.714

NOTE: Cue Weighting:
Range: 1-6
1 Most Significant Factor -- Insignificant

that benefit the firm. In the McAllister, Inc. case, the lowest weighting is placed on the objections of a medium-sized, stable client. The Winslow Co. case results demonstrate greater reliance by CPAs on the assertions of long-time clients; low reliance is especially indicated for a newer, medium-sized client.

The weighting of hard evidence cues was found to be significantly impacted by environmental factors. Thus, the results support Hypothesis 4. An interpretation of the experimental group mean cue weightings suggests the existence of various environmental "biases," the influence of environmental cues on the weighting of hard

evidence. This important finding will be further discussed in the next chapter.

Hypothesis 5: The significance of environmental factors is dependent on the size of the CPA firm. Smaller firms are anticipated to exhibit heavier reliance on environmental cues.

Two three-way analyses of variances were performed for each audit judgment. The factors were client size, length of association, and CPA firm size in the first set of analyses, and client size, growth pattern, and CPA firm size in the second. To maintain an adequate sample size per cell, it was decided that two three-way analyses would be conducted rather than one four-way ANOVA. The latter approach would result in a doubling of the number of cells from eight to sixteen. The present analyses also appear appropriate since prior tests revealed few first order interactions and no second order interactions between the environmental factors. The analyses combined CPA firm size with pairs of environmental variables found to interact most significantly in the earlier results, i.e., the interactions of (1) client size X growth pattern, and (2) client size X length of associations were the only substantial interactions discovered. The results of the analyses are presented in Table 10.

The finding of greatest importance in testing Hypothesis 5 is the presence of significant interactions

TABLE 10

ANALYSES OF VARIANCE: THE EFFECT OF ENVIRONMENTAL FACTORS ON AUDIT JUDGMENTS AS A FUNCTION OF CPA FIRM SIZE

Audit Decision	Factor(s)	F	Significance
ANOVA (FS,S,L)*			
McAllister, Inc.:			
Audit Adjustment	CPA Firm Size	3.294	.076
Footnote Disclosure	CPA Firm Size	4.625	.037
Winslow Co.:			
Audit Adjustment	CPA Firm Size	5.825	.020
Footnote Disclosure	CPA Firm Size	6.456	.015
	S X FS	3.030	.089
ANOVA (FS,S,G)*			
McAllister, Inc.:			
Audit Adjustment	CPA Firm Size	3.135	.084
Footnote Disclosure	CPA Firm Size	3.939	.054
Winslow Co.:			
Audit Adjustment	CPA Firm Size	23.001	.014
	S X G	3.067	.087
	G X FS	3.535	.067
Footnote Disclosure	CPA Firm Size	5.836	.020
	S X FS	3.603	.064

*Letter designations refer to: FS CPA Firm Size; S Client Size; L Length of Association; G Client Growth Pattern

NOTE: Only significant ($p \leq .10$) results are shown. df = 1 for all factors and interactions; df = 43 and 44 for within-group variance for McAllister and Winslow cases respectively.

between CPA firm size and any of the environmental factors. Therefore, the focus of the following interpretation of the results will be on these interactions. As Table 10 reveals, the analyses of the McAllister, Inc. case found no significant CPA firm size X environmental factor interactions. However, in the Winslow Co. Case, three such interactions appeared. An analysis of experimental cell means is provided in Table 11.

The response means indicate that generally subjects from national CPA firms concluded an audit adjustment was necessary in the Winslow Co. Case whereas the local/regional CPA firm members were "neutral" (undecided) in requiring the adjustment. The national firms were especially insistent on an audit adjustment for the growth client. National firm CPAs felt footnote disclosure was not sufficient while local/regional CPAs were largely neutral. Local/regional firms were more willing to accept footnote disclosure for the large client than the medium-sized company. The national CPAs believed that footnote disclosure alone was especially inappropriate for the large client. These results suggest that subjects from the national firms are more cautious with large, growth clients than smaller, stable firms. Local/regional CPAs, on the other hand, appear to be more liberal with the larger client in the sense of

TABLE 11

MEAN AUDIT DECISION RESPONSE: ANALYSIS OF SIGNIFICANT INTERACTIONS (CPA FIRM SIZE x ENVIRONMENTAL FACTORS)

Winslow Case

Audit Decision:

Audit Adjustment	CPA Firm Size	Growth Pattern: Growth	Growth Pattern: Stable
	National	2.583	3.000
	Local/Regional	4.200	4.000

Footnote Disclosure	CPA Firm Size	Client Size: Large	Client Size: Medium
	National	5.175	5.000
	Local/Regional	3.563	4.375

NOTE:
Response Range: 1 - 7
Yes - No

greater willingness to accept only footnote disclosure. The growth pattern of the client did not substantially affect the decisions of local/regional subjects.

These findings do not support Hypothesis 5. On the McAllister, Inc., case, there were no significant interactions between CPA firm size and any of the environmental factors. The subject responses on the Winslow case did reflect such interactions; however, both national and local/regional CPAs appeared to rely on environmental cues. The judgments of local/regional subjects on the latter case partially support the contentions of critics that smaller CPA firms tend to

favor large clients. However, the decisions of the national CPAs were in conflict with allegations that larger growth clients are treated more liberally than other clients. National CPAs were more stringent with such a client in the Winslow case. The results, therefore, indicate that the impact of environmental factors may vary with CPA firm size. However, such a relationship appears to be situation specific.

Table 10 indicates that the variable of CPA firm size was a significant factor in explaining the variation in audit judgments. This is an important finding and is addressed later in this chapter in the discussion of the findings of "Additional Test Results of Interest."

To determine whether the affect of environmental factors on the weighting of hard evidence cues varied with CPA firm size, additional ANOVA tests were performed. As for the audit decisions described before, two three-way ANOVA's were conducted for each of the three hard evidence cues. Table 12 indicates the results of these analyses.

Once again the findings of major concern are significant <u>interactions</u> between environmental cues and CPA firm size. The mean hard cue weightings for the various experimental cells are provided in Table 13. The results are difficult to interpret, since there is no

TABLE 12

ANALYSES OF VARIANCE: THE EFFECT OF ENVIRONMENTAL FACTORS ON PERCEIVED HARD EVIDENCE RELIANCE AS A FUNCTION OF CPA FIRM SIZE

Hard Evidence Cue	Factor(s)	F	Significance
ANOVA (FS,S,L)*			
McAllister, Inc.:			
Materiality	Client Size	4.691	.036
	Length of Association	3.540	.067
Client Objections	S X FS	4.549	.039
	L X FS	2.864	.098
Winslow Co.:			
Client Objections	S X L X FS	4.247	.045
Accounting Principles	S X L	2.950	.093
	S X L X FS	2.957	.093
ANOVA (FS,S,G)*			
McAllister, Inc.:			
Materiality	Client Size	3.705	.061
	S X FS	3.255	.078
Client Objections	Client Size	2.971	.092
	S X FS	3.451	.070
Winslow Co.:			
Accounting Principles	Growth Pattern	4.148	.048

*Letter designations refer to: FS CPA Firm Size
S Client Size
L Length of Association
G Client Growth Pattern

NOTE: Only significant ($p \leq .10$) results are shown. df = 1 for all factors and interactions; df = 43 and 44 for Within-group Variance for McAllister, Inc. and Winslow Co. cases respectively.

TABLE 13

MEAN CUE WEIGHTINGS FOR EXPERIMENTAL CELLS:
ANALYSIS OF SIGNIFICANT INTERACTION BETWEEN
CPA FIRM SIZE AND ENVIRONMENTAL FACTORS

Hard Evidence Cue:

McAllister Inc.:

Client Objections	CPA Firm Size	Client Size: Large	Client Size: Medium
	National	4.273	5.454
	Local/Regional	4.400	4.438

	CPA Firm Size	Length of Association: 11-13 Yrs.	Length of Association: 2-3 Yrs.
	National	5.222	4.615
	Local/Regional	4.235	4.643

Materiality	CPA Firm Size	Client Size: Large	Client Size: Medium
	National	1.750	3.182
	Local/Regional	2.000	2.250

Winslow Co.:

Client Objections	Association 11-13 Yrs.		Association 2-3 Yrs.	
CPA Firm Size	Large Client	Medium Client	Large Client	Medium Client
National	4.111	5.000	5.200	3.750
Local/Regional	4.143	4.000	4.250	4.857

Accounting Principles	Association 11-13 Yrs.		Association 2-3 Yrs.	
CPA Firm Size	Large Client	Medium Client	Large Client	Medium Client
National	1.625	2.000	1.600	2.000
Local/Regional	1.500	2.444	2.750	1.714

NOTE: Cue Weighting Range: 1 - 6
The Most Important Factor - Insignificant

apparent pattern between the cases. The weightings of client objections are contradictory across the cases, e.g., national CPAs placed the greatest reliance on the objections of large, newer clients in the Winslow case, while in the McAllister case the objections of large, older and medium, newer clients received more consideration. Materiality was relied upon more by national CPAs for larger clients than medium-sized firms in the Winslow case. In McAllister, Inc., accounting principles were given more weight by national CPAs when dealing with large firms; the reliance on these principles was a more complex phenomenon for local/regional subjects. Principles were utilized to a greater extent for large, older and medium, newer clients.

The influence of environmental factors on perceived cue usage appears to be situation specific when considering CPA firm size. The results suggest environmental factors do significantly impact the perceived reliance on hard evidence cues, as found earlier. However, there does not seem to be any pattern, of such reliance based on CPA firm size.

Hypothesis 6: The reliance on environmental factors is a function of the level of professional experience.

Employing the same approach as used to test Hypothesis 5, two three-way ANOVAs were performed for each audit decision and hard evidence weighting judgment.

The first ANOVA coupled audit experience with client size and association as the independent variables. The second analysis combined audit experience with client size and growth. The interactions between experience and environmental factors are of major interest. Table 14 reveals the findings of these tests.

A preliminary examination of the results appears to provide partial support for Hypothesis 6, since significant interactions between audit experience and environmental factors were found in two of the audit decisions in the McAllister, Inc. case. However, no such interactions occurred in the Winslow case. This suggests that the impact of experience on environmental biases is dependent on the decision context.

Table 15 provides an analysis of experimental cell mean responses for significant interactions. A higher mean judgment score indicates an audit adjustment or qualified opinion is not considered necessary and can, thus, be viewed as more "favorable" to the client.

A closer examination of the treatment means revealed that Hypothesis 6 is not supported. Hypothesis 6 posits that as a CPA gains experience, he forms a clearer perceived picture of the audit process and will, thus, have a basis to rely more heavily on environmental factors. However, the results do not demonstrate a clear pattern of responses as the level of experience rises.

TABLE 14

THE EFFECT OF ENVIRONMENTAL FACTORS ON AUDIT JUDGMENTS AS A FUNCTION OF LEVEL OF AUDIT EXPERIENCE

Three-way ANOVA

Judgment	Factors	F	Significance
ANOVA (E,S,L*)			
McAllister, Inc.:			
Audit Decisions			
Audit Adjustment	L x E	3.662	0.021
Qualified Opinion	S x L x E	2.235	0.100
Cue Weightings			
Materiality	S	3.367	0.074
Client Objections	S x E	3.553	0.023
Winslow Co.:			
Cue Weightings			
Client Objections	E	2.926	0.046
Accounting Principles	S x L	4.237	0.046
	S x L x E	2.579	0.089
ANOVA (E,S,G*)			
McAllister, Inc.:			
Cue Weightings			
Materiality	S	2.918	0.096
Client Objections	S x E	3.271	0.031
	S x G x E	2.237	0.100
Winslow Co.:			
Cue Weightings			
Client Objections	G	3.709	0.062
	E	3.297	0.031
Accounting Principles	G	4.098	0.050

*Refer to factors:
- E Audit Experience
- S Client Size
- L Length of Association
- G Client Growth Pattern

NOTE: Only significant results are shown ($p \leq .10$). df = 1 for factors S, L, and G; 3 for E; df = 38 and 39 for Within-group variance for McAllister, Inc. and Winslow Co. Cases respectively.

TABLE 15

MEAN AUDIT DECISION RESPONSE:
ANALYSIS OF SIGNIFICANT INTERACTIONS

(Audit Experience x Environmental Factors)

McAllister Case

Audit Decision

Audit Adjustment	Audit Experience	Length of Association Long	Short
	Less than 5 years	2.889	4.600
	6-9 years	6.000	3.750
	10-13 years	3.714	5.286
	Over 13 years	5.625	3.222

Qualified Opinion

	Long Association		Short Association	
Audit Experience	Large Client	Medium Client	Large Client	Medium Client
Less than 5 years	6.750	3.800	3.500	5.667
6-9 years	4.500	6.000	4.500	4.667
10-13 years	6.500	6.333	6.000	6.000
Over 13 years	4.000	5.333	5.600	6.250

NOTE: Range of Responses: 1 through 7
Yes - No

For example, in the audit adjustment decision, CPAs with less than 5 years and 10-13 years were more insistent on an adjustment for long-time clients than relatively new ones. The other experience groups (6-9 years and over 13 years) displayed the opposite judgments. These results may indicate that an auditor proceeds through stages in his career where different risks and rewards alter decision-making. Note that the group with the greatest experience (over 13 years) appeared to require an audit adjustment for the newer client but not for the

older one. This group can be anticipated to represent the highest managerial levels within the CPA firms, i.e., experienced partners.

All subjects generally did not favor a qualified opinion in the McAllister, Inc. case. Decisions do not provide a consistent relationship between environmental cue reliance and experience levels. Additionally, the level of significance of this second order interaction ($p = .10$) is relatively low.

The weightings of hard evidence cues revealed only one highly significant interaction between experience and environmental factors. This interaction related to the perceived reliance of the client's objections in the McAllister, Inc. case. The experimental cell means for this judgment were:

MCALLISTER CASE

Mean Weighting of Client Objections*:

	Client Size	
Audit Experience	Large	Medium
Less than 5 years	4.833	4.750
6-9 years	4.286	4.200
10-13 years	3.333	5.250
Over 13 years	4.889	4.857

*Range: 1 through 6

Most Important Factor--Insignificant or Irrelevant

The conscious reliance on client objections is similar for all experience levels except those CPAs with 10-13 years of audit experience. This group placed greater weight on the objections of large clients than medium clients. The reasons for such a differential weighting are difficult to conjecture. Perhaps the 10-13 year experience level is critical in the career of a CPA; it is the time when most CPAs are considered for the position of partner in the firm. This situation may cause such an alteration in conscious cue weighting.

In summary, the findings do not indicate heavier reliance on environmental factors with greater audit experience. Therefore, Hypothesis 6 is not supported. However, despite the fact that a consistent pattern is not demonstrated, experience does appear to affect the usage of environmental cues on certain judgments.

Hypothesis 7: There will be a significant difference between student judgments and auditors, i.e., students are poor surrogates for practicing auditors.

To test Hypothesis 7 a t-Test was performed comparing the mean responses of students and CPAs on the audit decisions and weighting of hard evidence cues. Table 16 presents the findings of this analysis. Responses of students and auditors were significantly different in both cases on the audit adjustment decision, the most important judgment examined. CPAs were more

TABLE 16

ANALYSIS OF RESPONSES OF CPAs vs STUDENTS

Dependent Variable	Mean		SD		T		Signifi-
	Students	CPAs	Students	CPAs	Value	df	cance
Audit Decisions							
McAllister, Inc.:							
Audit Adjustment	3.505	4.290	2.015	2.028	-2.24	154	0.026
Footnote Disclosure	3.596	3.774	2.096	2.107	-0.65	153	NS
Qualified Opinion	4.323	5.323	1.923	1.871	-3.10	152	0.002
Winslow Co.:							
Audit Adjustment	2.667	3.730	1.540	1.985	-3.65	156	0.000
Footnote Disclosure	3.905	4.387	2.027	2.145	-1.59	154	NS
Cue Weighting							
McAllister, Inc.:							
Materiality	2.628	2.254	1.336	1.257	1.66	154	0.100
Client Objections	4.213	4.607	1.406	1.084	-1.81	152	0.072
GAAP	2.223	2.117	1.263	1.263	0.58	151	NS
Winslow Co.:							
Materiality	2.474	2.581	1.236	1.287	-0.56	154	NS
Client Objections	4.379	4.426	1.346	1.284	-0.33	153	NS
GAAP	2.126	2.016	1.231	1.123	0.83	154	NS

NOTE: $p \leq 0.10$.

inclined to require the adjustment than students. Practitioners also felt more strongly that footnote disclosure alone was not adequate. CPAs did not favor a qualified opinion, whereas students were somewhat "neutral" on this decision. Therefore, CPAs and students appeared to arrive at significantly different audit judgments, and Hypothesis 7 is accepted.

CPAs weighed generally accepted accounting principles more heavily than students in both cases. The weighting of hard evidence cues was significantly different only in the McAllister, Inc. case. Students placed greater reliance on client objections and less on materiality than auditors. No significant variation in weighting was discovered in the Winslow case.

Thus, the results suggest students make substantially different audit decisions than CPAs and are, therefore, poor surrogates. Additionally, the two groups may have substantial differences in the weighting of hard evidence cues, but such differences appear to be unpredictable and situation specific.

Summary of Results of Hypothesis Tests

Table 17 summarizes the empirical findings regarding the seven research hypotheses posed in Chapter III. The environmental cues do not appear to be weighed heavily enough to alone alter CPA judgments. Instead, these factors apparently are "intermediary" or "secondary" cues influencing the reliance and interpretation of hard evidence information. This impact may be substantial enough to alter an auditor's judgment. Auditors displayed proper self-insight regarding the apparent limited significance of environmental factors. CPAs from various sized firms did not demonstrate a consistent

TABLE 17

SUMMARY OF HYPOTHESIS TESTS

Hypothesis	Analysis	Results
H1: Audit judgments are significantly affected by environmental factors.	Three-way ANCOVA	Not Supported: The independent variables (environmental cues) failed to explain a significant portion of the variation in CPA judgments.
H2: There are substantial differences in the weighting placed on various environmental cues. Additionally, the interaction of cues has an important impact on audit decisions.	Comparison of significance of cues within and across cases	Partially Supported: Apparently some cues are weighted more than others. However, the interactions are as significant as the cues (main effects) and such interactions appear to be situation specific.
H3: Auditors are not aware of the significant reliance on environmental factors.	Content Analysis	Not Supported: Consistent with the results in testing H1, CPAs indicated only limited reliance on environmental cues. Subjects demonstrated wide variation in the perceived cues utilized.
H4: The weighting placed on a hard evidence cue is materially affected by the existence of environmental factors.	Three-way ANCOVA	Supported: Environmental factors do appear to have affected hard evidence cue reliance in both cases. Further, a pattern of this affect was found, suggesting the importance of environmental factors as "intermediary" cues.
H5: The significance of environmental factors is dependent on the size of the CPA firm. Smaller firms are anticipated to exhibit heavier reliance on environmental cues.	Three-way ANOVA	Not Supported: On the McAllister case, there was not a significant reliance on environmental factors for large or small CPAs. National as well as local CPAs appeared to be influenced by environmental cues in the Winslow case.

TABLE 17 continued

SUMMARY OF HYPOTHESIS TESTS

Hypothesis	Analysis	Results
H6: The reliance on environmental factors is a function of the level of professional experience.	Three-way ANOVA	Not Supported: However, the reliance on environmental factors was significantly influenced by audit experience on several decisions in the McAllister case.
H7: There will be a significant difference between student judgments and auditors; i.e., students are poor surrogates for practicing auditors.	T-Test	Supported: The audit adjustment and qualified opinion decision was significantly different for CPAs and students. The weighting of hard evidence cues also varied substantially on the McAllister case but not on Winslow.

difference in reliance on environmental cues; any such differences appear to be situation specific. Finally, the analysis of student and auditor decisions suggest that students are poor, unpredictable surrogates for practitioners in examining subjective, high level audit judgments. Students and CPAs were provided the same instructions, cases, and completion time in the study. Thus, several measures were taken to establish an experimental setting that was as similar as possible for both groups. However, the impact on subject responses of the experimental environment (classroom versus professional meeting) cannot be determined. The measures taken are considered to achieve the highest internal validity possible for this study.

Additional Test Results of Interest

The Effect of Other Demographic Variables on Environmental Cue Reliance

Hypothesis 5 and 6 investigated whether reliance on environmental cues varies with CPA firm size and professional experience respectively. Performing similar three-way ANOVAs, the impact of age, membership in the SEC Firm Practice Division, and educational degrees was examined. These analyses were exploratory in nature attempting to discover relationships between such demographic factors and reliance on environmental cues. The

three variables selected were those found to be significantly related to audit judgments in the earlier tests; experience and CPA firm size, as noted before, were also examined in connection with testing research hypotheses.

The interaction between such demographic variables and environmental factors in significantly explaining the variation of audit judgments was of paramount concern. A small number of such interactions were found. However, a consistent pattern across cases was not discovered. Thus, the impact of these demographic factors on environmental cue weighting appears to be limited and situation specific. The numerical results are not presented because of the absence of significant relationships found and the fact that this issue is not a major thrust of the study.

Consensus of Subject Responses

Frequently in Human Information Processing studies, such as this, the variability of subject judgments is of major interest. For example, the Report of the 1976-77 Committee on Human Information Processing (American Accounting Association, 1977) identified several "output variables" that are commonly examined by HIP researchers. Three major aspects of subject judgments mentioned by the Report as receiving wide attention are (Table A3):

I. Qualities of the Judgment or Decision;

II. Self-Insight; and

III. Amount of Information Used.

Response variability (concensus) is listed under the first area above related to the reliability of the decision. Consensus is of major concern, especially among experts such as CPAs and lawyers. Quality control is extremely difficult if decision makers arrive at widely varying judgments given the same set of facts. Since, as noted at the onset of this study, quality control is of great importance to the auditing profession, subject consensus was examined in this experiment.

Response variability was measured by the Coefficient of Variation (Standard Deviation/Mean). Table 18 presents information of judgment consensus on the audit decisions and hard evidence cue weightings for three major categories of subjects:

(1) CPAs -- National firms;

(2) CPAs -- Local/Regional firms; and

(3) Students

The responses of National vs Local/Regional CPAs are examined separately because such an analysis is of current major interest (see earlier discussion related to Hypothesis 5) to the profession. Also CPA firm size was a significant explanatory variable for virtually all of the audit judgments.

TABLE 18

CONSENSUS OF SUBJECT RESPONSES

Judgment	CPAs Overall Mean	CPAs Overall Coefficient of Variation	Natl. CPAs Mean	Natl. CPAs Coefficient of Variation	Local/Regional CPAs Mean	Local/Regional CPAs Coefficient of Variation	Students Mean	Students Coefficient of Variation
Audit Decisions								
McAllister, Inc.:								
Audit Adjustment	4.2459	47%	3.7391	62%	4.5806	39%	3.5053	57%
Footnote Disclosure	3.8197	55%	4.4348	48%	3.4839	60%	3.5957	58%
Qualified Opinion	5.2951	35%	5.2174	39%	5.4516	32%	4.3226	44%
Winslow Co.:								
Audit Adjustment	3.6935	54%	2.7826	77%	4.1250	41%	2.6667	58%
Footnote Disclosure	4.4426	48%	5.4348	37%	3.9688	51%	3.9053	52%
Cue Weightings								
McAllister, Inc.:								
Materiality	2.2742	55%	2.4348	65%	2.1250	49%	2.6277	51%
Client Objections	4.6000	24%	4.8636	27%	4.4194	20%	4.2128	33%
GAAP	2.1017	60%	1.8500	59%	1.9688	60%	2.2234	57%
Winslow Co.:								
Materiality	2.5902	50%	2.7727	50%	2.4063	48%	2.4737	50%
Client Objections	4.4500	29%	4.4545	33%	4.2903	28%	4.3789	31%
GAAP	1.9672	54%	1.7727	49%	2.1250	58%	2.1263	58%

Table 18 reveals that generally all subjects demonstrated relatively low consensus on the audit judgments. For example, responses on the major audit decisions indicated wide disagreement among CPAs:

		% Favoring	% Opposed
McAllister, Inc.:	Audit Adjustment	40%	60%
	Footnote Disclosure	53%	47%
Winslow Co.:	Audit Adjustment	49%	51%
	Footnote Disclosure	42%	58%

This finding (low consensus) is consistent with the results of prior HIP studies reviewed in Chapter II (Joyce, 1976; Mock and Turner, 1978).

CPAs from national firms showed a great deal less consensus than local/regional CPAs on the major decision of the experiment, the need for an audit adjustment. However, the smaller firm CPAs demonstrated greater disagreement as to the adequacy of footnote disclosure. National CPAs had slightly greater variability of responses in cue weightings. Overall national CPAs revealed less consensus on more of the judgments than members from local/regional firms and exhibited higher extreme values of coefficients of variation.

Students displayed generally less consensus than CPAs as a group. However, the judgments that led to greater disagreement among CPAs also resulted in low consensus among students. Thus, students had slightly lower consensus on almost all judgments but the difference

in the coefficient of variation on any one decision was not as great as the disparity between national and local/ regional CPAs on some issues.

Impact of Demographic Factors on Audit Decisions

As discussed above, CPAs exhibited great variability in audit decisions on the cases. The central theme of this study is to investigate the significance of environmental cues in explaining the variation in audit judgments; the findings indicated that such cues may be important secondary factors. In a further endeavor to explain the variation in responses the impact of five demographic factors is examined.

(1) CPA firm size;

(2) age;

(3) firm membership in the SEC Firm Practice Division;

(4) academic degrees; and

(5) professional experience.

These factors were selected for analysis because they appeared as significant explanatory covariates in the earlier hypothesis tests.

Separate one-way ANOVAs were performed for each of the demographic factors. The results of the analyses are provided in Table 19. CPA firm size and academic degrees are the only attributes that reflect consistent

TABLE 19

IMPACT OF SELECTED DEMOGRAPHIC FACTORS ON AUDIT JUDGMENTS:
ONE-WAY ANOVAs: BETWEEN-GROUPS EFFECT

	CPA Firm Size		Age		Academic Degrees		SEC Division		Audit Experience	
Judgment	F	Signif.	F	Signif.	F	Signif.	F	Signif.	F	Signif.
Audit Decisions										
McAllister, Inc.:										
Audit Adjustment	3.314	0.075	1.743	NS	7.270	0.009	0.410	NS	0.805	NS
Footnote Disclosure	4.000	0.051	0.479	NS	4.734	0.034	0.565	NS	1.320	NS
Qualified Opinion	0.433	NS	0.615	NS	0.725	NS	0.299	NS	1.587	NS
Winslow, Co.:										
Audit Adjustment	6.248	0.016	0.875	NS	0.587	NS	1.679	NS	0.630	NS
Footnote Disclosure	6.391	0.015	2.290	0.060	3.453	0.069	5.095	0.029	1.369	NS
Cue Weighting										
McAllister, Inc.:										
Materiality	0.625	NS	1.359	NS	0.382	NS	1.299	NS	0.463	NS
Client Objections	1.770	NS	2.016	0.093	0.696	NS	0.103	NS	0.799	NS
GAAP	0.132	NS	1.668	NS	0.939	NS	0.093	NS	0.756	NS
Winslow, Co.:										
Materiality	0.903	NS	1.625	NS	0.123	NS	0.405	NS	0.580	NS
Client Objections	0.134	NS	1.305	NS	0.146	NS	0.000	NS	2.297	0.089
GAAP	1.261	NS	1.940	NS	0.020	NS	0.795	NS	0.718	NS

NOTE: $P \leq 0.10$: degrees of freedom:	CPA Firm Size	Age	Degrees	SEC Div.	Experience
McAllister	1, 49	4, 48	1, 51	1, 47	3, 50
Winslow	1, 50	4, 48	1, 51	1, 48	3, 50

significant differences between groups on the audit decisions. None of the background variables explain a substantial amount of variation in the weighting of hard evidence cues. As discussed earlier, CPA firm size does appear to have an important affect on audit decisions. Table 19 indicates national CPAs were more insistent on an audit adjustment in both cases and accordingly, were less satisfied with footnote disclosure alone than local/ regional firms. This implies that given the same set of facts national CPAs appear to be more conservative and risk-averse than their counterparts in smaller firms.

Academic degrees also appear to have significantly affected audit decisions. The mean response of subjects on each audit decision by academic degree level is presented in Table 20. Practitioners with graduate degrees were more inclined to require an audit adjustment and were less satisfied with footnote disclosure than CPAs with only a Bachelors degree. Perhaps this phenomenon is partially due to an interrelationship between educational degrees and CPA firm size. CPAs with graduate degrees tended to come from the national firms (Pearson Correlation coefficient 0.17, significance= 0.102). At any event, academic degrees appear to have an important impact on audit decisions.

A noteworthy finding is that the audit judgments between CPAs affiliated with firms belonging to the SEC

TABLE 20

MEAN RESPONSE ON AUDIT DECISIONS:
ACADEMIC DEGREES (HIGHEST DEGREE ATTAINED)

Audit Decisions	Bachelor's Degree	Graduate Degree
McAllister Inc.:		
Audit Adjustment	4.61	2.92
Footnote Disclosure	3.54	5.00
Qualified Opinion	5.37*	4.84*
Winslow Co.:		
Audit Adjustment	3.63*	3.15*
Footnote Disclosure	4.25	5.46

NOTE: Range of Responses: 1 through 7
Yes - No
* Not a significant difference between groups ($p \leq .10$)

Firm Practice Division did not significantly differ from CPAs in non-member firms. Thus, CPAs from member and non-member firms do not appear to substantially differ as to basic decision approach and risk propensity, as some critics have alleged. Since the SEC Firms Practice Division has only recently started, it would be interesting to see if at a later date member and non-member CPAs begin to reflect decision differences as a result of the requirements/reforms (peer review, partner rotation, etc.) of the Division.

Summary of the Major Findings

The most important finding is that environment factors alone do not appear to be significantly relied

upon enough to alter audit judgments. Instead such factors substantially affect the weighting of other, hard evidence cues and, thus, appear to be significant "secondary cues." Environmental factors were found to consistently influence the conscious reliance of the hard evidence cues across both cases.

Subjects mentioned several cues utilized in decision-making and demonstrated appropriate self-insight regarding the apparent secondary importance of environmental factors. The reliance on environmental cues was affected by the experience and size of the CPA firm affiliation of subjects, but such reliance appears to be situation specific. Students were found to be poor surrogates for CPAs in arriving at the high level, difficult audit decisions encountered in the study.

Participants generally demonstrated low consensus in judgments, practitioners from national firms displaying lower consensus than local/regional CPAs. CPA firm size was an important explanatory variable of audit decisions. National CPAs were more insistent on audit adjustments in both cases and were, thus, generally less willing to accept risk than local/regional CPAs. Academic degrees was also a significant variable. Subjects with graduate degrees were more inclined to require an audit adjustment than those having a Bachelors degree as the highest

degree attained. Membership of the participant's firm in the SEC Firm Practice Division did not appear to significantly impact audit judgments.

The final chapter will analyze these findings in greater depth and explore their implications for audit practice. The limitations of this study also will be discussed.

CHAPTER VI

DISCUSSION OF THE RESULTS AND AVENUES FOR FUTURE RESEARCH

This concluding chapter begins with a discussion of the major findings and their implications for practice. The methodological limitations of the study are then identified along with a summary of the measures taken to minimize these limitations. The chapter concludes with an identification of promising avenues for future research.

Major Findings and Implications

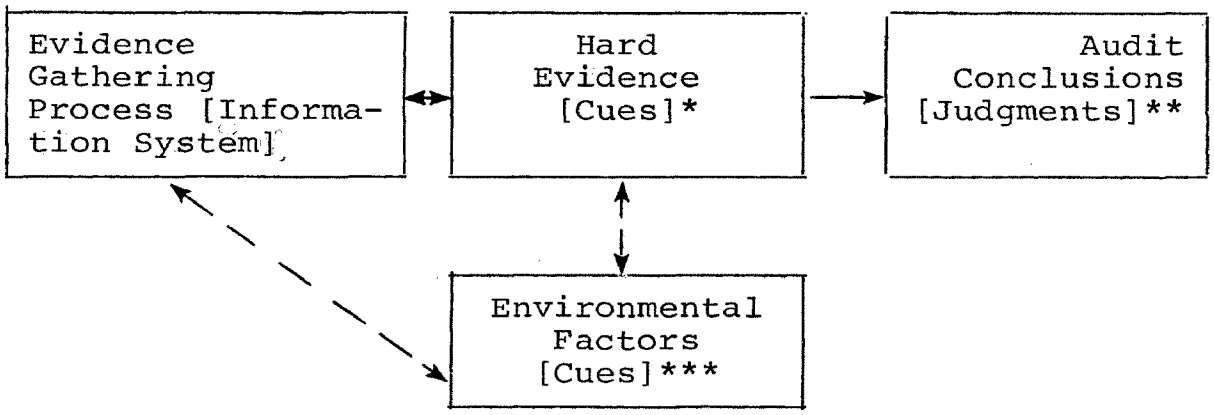
Affect of Environmental Factors on Audit Judgments

Findings

The major empirical results of this study are depicted in Figure 6, a Model of the Gathering and Weighting of Audit Evidence. The solid arrows indicate the direct and pronounced influence of one variable on another and the flow of the model. The broken arrows denote a secondary or peripheral impact among variables. Two directional arrows suggest a feedback relationship. The evidence gathering process is the audit procedures performed to obtain information as to the propriety of the client's financial statements. These general

FIGURE 6

MODEL OF THE GATHERING AND WEIGHTING OF AUDIT EVIDENCE



*Multiple cues employed
**Poor consensus (on subjective, complex judgments studied).
***Apparently proper self-insight of auditors as to the secondary influence of such cues; reliance on environmental cues appears to be situation specific

procedures were outlined in Figure 3, "Model of the Audit Decision Process."

As illustrated in this model, the most significant finding was that the environmental cues alone were not relied upon heavily enough to substantially alter audit decisions. However, the environmental factors did significantly affect the perceived weighting of other vital hard evidence cues. For example, the objections of the larger client were given greater consideration and weight than the medium-sized client. Objections of older, growth clients also appear to be relied upon to a greater degree than newer, stable firms. These results suggest that environmental factors may be important "secondary" or "intermediary" cues substantially influencing the reliance and interpretation of other vital cues in the decision process. Although environmental factors alone do not appear to significantly impact audit decisions, such factors may sufficiently affect reliance on other hard evidence cues so as to alter audit judgments.

This finding as to the apparent secondary impact of environmental factors may be due to the training and educational background of auditors. Audit standards, courses, and training programs deal almost exclusively with the consideration and gathering of hard evidence. Environmental cues are treated as only peripheral information. Perhaps the results of the experiment

reflect this professional training and focus.

The findings may also have occurred because of weaknesses in external validity. The cases may not properly simulate the client pressures and risks and rewards on an audit engagement. Reliance on environmental cues may actually be significant in practice. Additionally, subjects may have perceived that the experiment investigated knowledge of accounting issues. Thus, practitioners may have focused on these issues and disregarded environmental factors that would normally be considered. The measures taken to minimize these limitations in external validity are discussed in a later section of this chapter. The comments of subjects of the pilot study indicated a high level of realism in the cases employed. As a result of the actions taken, strong external validity is believed to be present in this experiment. Future empirical findings in this area may help corroborate and add to the validity of the results of the present study.

This study examined the perceived weighting of three hard evidence cues:

(1) materiality;

(2) client objections; and

(3) generally accepted accounting principles.

As noted, the objections of large, older, and growth clients received greater weight than others. This result

appears to partially support the arguments of critics that CPAs are inclined to favor such firms. However, there was not a clear pattern of preference for these clients on the other cues. In the McAllister case, greater perceived reliance was placed on materiality for the larger, new client. This difference in materiality weighting was not found in the Winslow case. CPAs relied more on accounting principles for large firms in the McAllister case and for stable clients in the Winslow case. Thus, although environmental factors appear to significantly alter the usage of hard evidence cues, a pattern was not present. The impact of such factors seems to be situation specific.

Implications of Primary Findings

The secondary influence of environmental cues found in this study bodes well for the auditing profession. Contrary to the allegations of critics, CPAs do not appear to display strong consistent biases favoring large, growth, and/or older clients. Auditors seemed to be weighing the hard evidence in each case and were only indirectly affected by the environmental factors. This finding suggests auditors can maintain independence.

However, the fact that environmental factors do appear to affect reliance on other cues suggests that

these factors may influence audit decisions. This is especially so since the influence of environmental cues may be even greater in practice due to the generally weaker effects of experimental treatments found in laboratory experiments, such as this (Kerlinger, 1973, p. 399). Therefore, to insure quality control, the profession must take steps to prevent unwarranted environmental biases. The measures taken by the SEC Firms Practice Division in this area appear to be in the right direction, i.e., peer review by members firms, partner rotation on engagements. Additionally, it is suggested that on major, complex audit decisions, the responsible partner consult an independent peer(s). The peer should, of course, be informed of all issues surrounding the situation. However, care should be taken to keep the identity, size and other environmental factors from the peer's attention. Thus, the peer(s) will be able to express an independent judgment free from the influences of these factors. Such guarded consultation may further serve as a defense if any future legal proceedings are brought against the firm.

A significant implication of the apparent limited influence of environmental cues is that self-policing by the auditing profession may be effective. Several critics, e.g., Metcalf Report, argue that CPAs cannot be

truly independent due to the substantial influence of audit fees and other environmental factors and, therefore, any self-policing efforts will be futile. The conclusion of these critics is often that government control over the profession is necessary as the only effective means to insure independent, objective audits. The secondary impact of environmental cues found in this study implies that CPAs can process audit evidence and render independent audit opinions. This suggests that reforms taken by the profession can further insure independence and be quite effective.

Impact of Demographic Factors on the Usage of Environmental Cues

Reliance on environmental factors was found to be significantly affected by CPA firm size and professional experience. However, there was not an established pattern across the audit cases. Any such relationships appear situation specific. CPAs from national and local/regional firms both appeared to rely on environmental factors on audit decisions in the Winslow case. Smaller firm CPAs were inclined to favor large clients, while national practitioners revealed greater conservatism for large, growth companies. In the McAllister case, however, usage of environmental cues was not significantly influenced by CPA firm size. Weighting of hard evidence

cues was also found to be affected by CPA firm size, but again a pattern was not present.

Usage of environmental cues does not appear to be a function of audit experience, as conjectured in hypothesis 6. CPAs with less than 5 and 10-13 years of experience were more insistent on an audit adjustment on the McAllister case for the older clients than the other groups. Thus, reliance on environmental cues may differentially affect CPAs at various experience levels.

Other demographic factors were found to affect the usage of environmental cues only on a limited, situation specific basis. Thus, none of the other demographic variables (e.g., age, educational degrees) appear to significantly impact the reliance on environmental factors.

Subject Self-Insight and Consensus

CPAs displayed good self-insight regarding the limited reliance on environmental factors. However, this finding is restricted to the environmental cues. The experiment was designed to examine the impact of environmental factors. Data is not available to determine subject usage of other cues. Therefore, there is no basis to determine if CPAs have strong self-insight on the other, more significant cues. Perhaps, overall, practitioners have poor self-insight as to the reliance

on the major primary cues employed to arrive at the audit judgment in each case. However, the finding of good self-insight of CPAs as to the weighting of environmental factors is important for future research in this area.

Practitioners demonstrated low consensus on all judgments. CPAs from national firms generally revealed a lower degree of consensus than local/regional CPAs. This result has important implications as to quality control. If auditors arrive at widely different conclusions when given essentially the same facts, the goal of maintaining consistent and reliable audit opinions among CPAs becomes extremely difficult to achieve. The results suggest greater guidelines are necessary for auditors for the complex decisions investigated in this study.

The results provide further evidence to the already pervasive findings of other studies (e.g., Pattillo, 1974) that an operational definition of materiality is sorely needed. The cases in this experiment were structured, as discussed earlier, to require respondents to make a materiality judgment. In fact, materiality was the most frequently cited reason for the audit decision arrived at. Yet, the degree of consensus of the importance of materiality in each case was among the lowest of all judgments. The applicability of generally

accepted accounting principles (gaap) is of key importance in both cases. Revenue realization is the major issue in the Winslow case. The role of financial statements and the nature of contingent losses are the paramount considerations in the McAllister case. Both of these issues are commonly encountered in practice and are of great concern currently to the accounting profession. The consensus among CPAs of the importance of gaap, however, was quite low in both cases. This suggests the need for improved theoretical guidelines for auditors to approach such problems and provides further evidence for the vital importance of the FASB Conceptual Framework Project (Financial Accounting Standards Board, 1976) currently in progress. This project will endeavor to provide a consistent theoretical framework for practitioners to draw upon to resolve accounting issues.

The generally low consensus among subjects implies that the suggestion posed earlier of independent peer consultation on major decisions appears to be well founded. Such consultation may substantially increase consensus. The lower consensus among CPAs from national firms is of special concern, since these are the practitioners involved to a large extent in the audits of the major corporations. Therefore, the problem of low consensus appears not to be restricted to the smaller CPA firms as some allege. The SEC Firms Practice Division

should direct its attention to this important quality control problem.

Suitability of Student Surrogates

Student audit decisions were significantly different than practitioners in both cases. CPAs displayed greater risk aversion and were more inclined toward an audit adjustment than students. The weighting of hard evidence cues also varied among students and CPAs but in an unpredictable, situation specific fashion. Students also demonstrated generally lower consensus than auditors.

These results suggest that students, even those that are accounting majors and have been exposed to an auditing course, as in this study, are poor surrogates for CPAs in complex, high level audit decision settings. This implies that past studies employing such surrogates must be viewed with great caution and reservation. Additionally, future researchers should be aware of the apparent significant loss in external validity when utilizing student surrogates in auditing research.

Affect of Demographic Factors on Audit Judgments

In an endeavor to explain the substantial variation in decisions among CPAs, the impact of various demographic factors was examined in a series of one-way Analyses of Variance. CPA firm size and academic degrees

were the only factors that significantly affected audit decisions. None of the demographic variables substantially explained the variation in perceived weighting of hard evidence cues.

CPAs from national firms were more conservative and risk averse on both cases than practitioners from smaller firms. This finding provides support to the contention that CPAs of larger firms arrive at significantly different decisions than their counterparts in local/regional firms. In fact, the one independent variable with the greatest explanatory power in this study was CPA firm size. This finding may be due to differences in the experience and risk environment among such firms. National CPAs frequently deal with audits of large SEC clients involving complex problems and great legal liability whereas local/regional CPAs normally face engagements with lower risk.

Differences found in decision making among national versus local/regional practitioners provide further justification for the need of the SEC Firm Practice Division to specifically monitor quality control of the generally larger CPA firms encountering the special difficulties and risks inherent in SEC audits. Another important finding discussed earlier is that national CPAs also demonstrated lower consensus than local/regional auditors. This quality control problem further indicates

the need for the new Division of the AICPA.

Subjects with graduate degrees were more risk averse, requiring an audit adjustment, than those holding a Bachelor's as the highest degree. There is no apparent reason for this finding except perhaps the fact that those with graduate degrees also tended to be associated with national CPA firms. Thus, this result may be due to the inter-correlation between CPA firm size and academic degrees.

Limitations of the Study

The major limitation of this research study appears to be the questionable strength of external validity in the decision settings and environment used. The open issue is whether the audit cases employed are a reasonably close simulation of an actual audit accompanied by the usual client pressures, risks, and rewards encountered by the auditor. Several measures were taken to strengthen external validity:

(1) a cross-section of practicing auditors served as subjects;

(2) the cases were taken from actual practice and were thoroughly reviewed for realism by CPAs;

(3) client pressures, risks (i.e., new security issue) and difficult issues were interjected

into the cases that are typical of those experienced in practice; and

(4) two cases were investigated with different accounting issues in an attempt to find pervasive usage of environmental cues across decision settings.

These measures are believed to have achieved a high level of external validity. This belief is further substantiated by the frequent comments of subjects and reviewers as to the realism of the cases.

Another limitation of the study is that only three environmental factors are examined of the many possible factors present. In order to make the study manageable and effective such a focus was necessary. However, it is certainly possible that the project failed to investigate the most significant environmental cues utilized in practice.

A related problem is that only one decision context is employed, i.e., materiality/disclosure judgments. Perhaps the affect of environmental factors is more significant in other audit decisions, e.g., determination of audit programs, evaluation of internal control. Once again the scope of the study was restricted in order to efficiently conduct and control the research.

A final limitation present is that subjects were requested to arrive at audit judgments without

consultation with peers. In practice CPAs often seek the opinion of other practitioners on difficult decisions. This limitation may partially account for the low consensus among subjects. Perhaps consensus is actually greater when peer interchange is unrestricted. However, participants in the study were generally at high staff levels and would be anticipated to make the final decision on audit issues.

Future Avenues for Research

An obvious extension of the present study is to investigate the impact of other environmental factors. For example, reputation of the client, anchoring on prior working papers, and sophistication of the accounting system (manual, computerized, etc.) may be examined. All of these factors have been alleged to influence audit decisions substantially.

Another extension would be to determine the affect of environmental factors on other audit judgments. Such cues may differentially influence various decisions, e.g., may substantially impact internal control evaluations but have little influence on footnote disclosures. A final refinement to the present study would be to examine the affect of environmental cues on group decision

making, i.e., allow free exchange of ideas and consultation among, say, three auditors. Such consultation is more representative of judgments made in practice.

As further research findings are gathered in this area, a later, vital study would be to attempt to set normative guidelines on how various environmental factors should be weighed and interpreted by auditors. For example, perhaps auditors should expand audit programs, be particularly cautious of adherence to generally accepted accounting principles, and require more disclosure for growth clients due to the inherent higher risk and probability of misstatement of such clients. This study and natural extensions, as noted, are expected to be descriptive in nature, attempting to find which environmental factors auditors rely upon and the direction (how) of such reliance. The later study envisioned is instead normative and focuses, on how these cues should be utilized, given the environmental cues that appear to be employed in practice.

Epilogue

This research study has found that environmental factors appear to be significant intermediary cues influencing audit judgments. Although it is widely recognized that such cues appear to be extensively used in the planning and other stages of an audit, virtually

nothing is known as to how and which environmental factors are actually utilized. This study is viewed as an initial step in this area of research that hopefully will spur future efforts. Environmental factors are potentially vital cues relied upon by auditors but have received little attention. The auditing profession and researchers can ill afford to ignore such factors, if quality control is to be maintained at high levels. Further research in this and other areas of Human Information Processing related to auditors is crucial to the understanding and improvement of the audit process.

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APPENDICES

APPENDIX A

TEST INSTRUMENT

I N S T R U C T I O N S

You will be presented two hypothetical case situations and then asked to make an audit decision on each. This is a research project in auditing. It cannot be overemphasized that you are asked to make each decision as if it were an actual audit engagement and you were assigned to do the job. The results of this research study will not be valid or useful if it does not represent actual audit decisions as they normally would be made by practitioners on the job. Your response will be anonymous and strictly confidential. Your assistance is greatly appreciated.

You are reviewing the workpapers on an audit of McAllister, Inc. The company is a real estate developer, specializing in luxury vacation areas. Profits have been reasonably stable over the last five years. Most of the development property is pledged as collateral on bank loans, but there is a reasonable stockholders' equity. McAllister, Inc. has been an SEC client of the firm for only two years.

McAllister has a substantial investment in a large parcel of land in Key Biscayne, Florida. The company originally paid $1,250,000 for the property two years ago and has since capitalized an additional $250,000 in interest and other capital expenditures.

The property is zoned for single family homes, but McAllister has been working diligently to have it re-zoned for condominiums. As a site for condominiums, the property would be more valuable and the company has an appraisal to that effect. However, if the property were to be sold as single family home sites, it would be worth no more than $1,170,000.

McAllister's management concedes that their efforts at re-zoning have met stiff local resistance, but they refuse to admit defeat. They are planning a subtle social pressure campaign on local political groups. Your audit inquiries confirm that the company has carried its re-zoning campaign through all the legal steps and has been turned down each time. It will clearly be difficult to obtain re-zoning for multi-family use - - difficult, but certainly possible.

Your staff people on the engagement report real frustration on this matter. They have concluded that the client cannot be successful in its re-zoning efforts, and therefore, they have suggested that the carrying value of the land be written down by $330,000. The client has objected, arguing that any such adjustment prejudges their ability to do their job. They acknowledge an uncertainty and have suggested that perhaps a footnote describing their plans and problems may be more appropriate than a write-down.

The Treasurer further argues that "Financial Statements are relied upon by several groups; borrowers and lenders, stockholders, etc. There should be no purposeful bias favoring any group. The application of conservatism may actually introduce bias and thus, must be carefully considered. Confining financial statements to the result of transactions and other events for which substantial evidence exists and recognizing the varying degree of uncertainty would aid in avoiding bias."

"It seems to me that any write-down on that land would reflect a bias, benefiting only you. Your benefit would be the reader's loss. I believe that, if necessary, a frank disclosure of the uncertainty results in a fairer presentation. Additionally, the write-down does not appear to be that material in my opinion."

Attached are the financial statements and selected statistics for McAllister, Inc., before the proposed audit adjustment.

Experimental Group #8: small client, short association, stable growth

McALLISTER, INC.
BALANCE SHEET
DECEMBER 31, 1977

ASSETS		LIABILITIES & STOCKHOLDER'S EQUITY	
Cash and Temporary investments	$ 963	Current Liabilities	$ 5,146
Investments in Land	$ 34,883	Long-term debt	34,981
Plant assets - net	16,361	Stockholders' equity	13,658
Other assets	1,578		
TOTAL ASSETS	$ 53,785	TOTAL LIABILITIES & STOCKHOLDERS' EQUITY	$ 53,785

INCOME STATEMENT
FOR THE YEAR ENDED DECEMBER 31, 1977
(Thousands of Dollars)

Revenue from land sales	$ 30,369
Cost of land	19,040
Gross profit	$ 11,329
Operating expenses	2,224
Income before taxes	$ 9,105
Income tax expense	3,642
Net Income	$ 5,463

KEY STATISTICS

	1977*	1976	1975	1974	1973
Return on assets	10%	9%	11%	12%	10%
Return on equity	40%	39%	40%	42%	38%
Earnings per share	$1.95	$1.92	$1.99	$2.07	$1.87

*Before considering the proposed adjustment

AUDIT DECISIONS

WOULD YOU REQUIRE THE PROPOSED ADJUSTMENT BE MADE? (Check one)

YES	MOST LIKELY YES	LEANING TOWARDS YES	NEUTRAL	LEANING TOWARDS NO	MOST LIKELY NO	NO
___	___	___	___	___	___	___

WOULD FOOTNOTE DISCLOSURE BE SUFFICIENT? (Check one)

YES	MOST LIKELY YES	LEANING TOWARDS YES	NEUTRAL	LEANING TOWARDS NO	MOST LIKELY NO	NO
___	___	___	___	___	___	___

WOULD A "SUBJECT TO" QUALIFIED OPINION BE APPROPRIATE? (Check one)

YES	MOST LIKELY YES	LEANING TOWARDS YES	NEUTRAL	LEANING TOWARDS NO	MOST LIKELY NO	NO
___	___	___	___	___	___	___

FACTORS CONSIDERED IN ARRIVING AT YOUR DECISION

Using the key below, evaluate the weight you placed on the following factors in making your decision in this case.

a. The most important factor
b. A major factor
c. Provided valuable guidance
d. Provided limited guidance
e. Provided little guidance
f. Insignificant or irrelevant

(1) Materiality (indicate one letter: a-f) _____
(2) Objections of the client (indicate one letter) _____
(3) Generally Accepted Accounting Principles (indicate one letter) _____

Briefly describe your reasoning for the audit decision indicated in this case:

WINSLOW COMPANY

Winslow Company, an SEC client of your firm for the last 13 years, has engaged underwriters and decided on a public offering of common stock. The underwriters, having reviewed the audited financial statements for the last five years, are interested in selling the new issue but have stated that they would not do so unless earnings for the current year were equal to or exceeded $1.00 per share. Your long-standing relationship with Winslow has been quite smooth and mutually advantageous.

Winslow Company basically has two lines of business. It manufactures a large peripheral computer equipment device, which either may be leased or purchased, and it provides computer maintenance services, either on an individual transaction or contract basis. In addition, the equipment division sells computer tapes and drives. Winslow is the largest company in the peripheral equipment industry. The company has had a relatively stable growth pattern.

During the course of the audit, your staff discover a large sale of tapes to Western, Inc., a business supply house. This transaction is unusual because Winslow generally sells its tapes to the ultimate user. The full order was shipped to Western under normal payment terms of 1/20/n60; Western had paid all amounts due by year end. Western was reluctant to purchase such a large order but did so after a provision was added to the sales agreement stipulating that Winslow would take any unsold tapes back if so requested within three years. Winslow management anticipates no problem on resale. Your staff has proposed an adjustment to account for this transaction as a consignment sale; the effect of this adjustment would be to reduce earnings per share by 5¢. There are two reasons advanced by your audit staff in support of the adjustment:

(1) There is no reliable and demonstrable experience to use as a basis to establish an allowance for sales returns (new type customer); and

(2) A confirmation from Western indicates that sales of the tapes have been slow.

Therefore, consignment accounting is appropriate in this case.

The client sternly objects to this adjustment, contending that earnings per share ($1.10) is already close to the lower limit specified by the underwriters and any adjustment might impair the success of the new stock issue. The Treasurer goes on to say, "We are against this proposed adjustment for two reasons:

(1) We can recognize the revenue currently and establish an allowance for return sales based on industry averages. Also, Western is selling the tapes. If the tapes are returned, we could readily sell them to other customers; and

(2) The adjustment does not have a material effect on the overall financial statements anyway."

Attached are the summarized Financial Statements and selected statistics for Winslow Company, before the proposed audit adjustment.

Experimental Group #2: Large client, Long Association, stable growth

WINSLOW COMPANY
BALANCE SHEET
DECEMBER 31, 1977

(Thousands of Dollars)

ASSETS		LIABILITIES & SHAREHOLDER'S EQUITY	
Cash & Temp. Investments	$ 24,151	Current Liabilities	$283,155
Accounts Receivable	271,787	Long-term Debt	191,402
Inventories	248,950	Shareholders' equity	359,641
Plant assets - net	292,307		
Other assets	5,003		
TOTAL ASSETS	$842,198	TOTAL LIABILITIES & SHAREHOLDERS' EQUITY	$842,198

INCOME STATEMENT
FOR THE YEAR ENDED DECEMBER 31, 1977
(Thousands of Dollars)

Equipment sales	$727,971
Lease Revenue	292,377
Maintenance revenue	93,022
Total Revenue	$1,113,370
Cost of Goods Sold	641,016
Gross profit	472,354
Operating expense	330,584
Income before taxes	141,770
Income tax expense	44,667
Net income	$ 97,103

KEY STATISTICS

	1977*	1976	1975	1974	1973
Return on assets	12%	10%	10%	9%	10%
Return on equity	27%	25%	25%	23%	24%
Earnings per share	$1.10	$.90	$.89	$.82	$.87

*Before considering proposed adjustment

WOULD YOU REQUIRE THE PROPOSED ADJUSTMENT BE MADE? (Check one)

YES	MOST LIKELY YES	LEANING TOWARDS YES	NEUTRAL	LEANING TOWARDS NO	MOST LIKELY NO	NO
___	___	___	___	___	___	___

WOULD FOOTNOTE DISCLOSURE BE SUFFICIENT? (Check one)

YES	MOST LIKELY YES	LEANING TOWARDS YES	NEUTRAL	LEANING TOWARDS NO	MOST LIKELY NO	NO
___	___	___	___	___	___	___

FACTORS CONSIDERED IN ARRIVING AT YOUR DECISION

Using the key below, evaluate the weight you placed on the following factors in making your decision in this case.

a. The most important factor
b. A major factor
c. Provided valuable guidance
d. Provided limited guidance
e. Provided little guidance
f. Insignificant or irrelevant

(1) Materiality (indicate one letter: a-f) _____
(2) Objections of the client (indicate one letter) _____
(3) Generally Accepted Accounting Principles (indicate one letter) _____

Briefly describe your reasoning for the audit decision indicated in this case:

PLEASE PROVIDE US WITH THE FOLLOWING BIOGRAPHICAL INFORMATION:

(1) AGE (Check one)

_____ Under 25
_____ 25-29
_____ 30-35
_____ 36-40
_____ 41-45
_____ 46-50
_____ 51-55
_____ Over 55

(2) How many years of audit experience do you have? (Check one)

_____ Less than 5 years
_____ 6-9 Years
_____ 10-13 Years
_____ 14-17 years
_____ over 17 years

(3) Please indicate the best description of your office of employment. (Check one)

_____ A national firm major city office.
_____ A national firm satellite office supervised by a major city office.
_____ A national firm independent non-major city office
_____ A regional firm office
_____ A local firm office

(4) Please indicate the title which best describes your position within your firm (check one)

_____ Staff accountant with substantial audit experience.
_____ Senior accountant with little supervisory experience.
_____ Senior accountant with substantial supervisory audit experience.
_____ Supervisor (or equivalent position).
_____ Partner

(5) Academic Degrees (check highest degree).

_____ High school
_____ Bachelors degree
_____ Masters degree
_____ Other (please specify).

(6) Is your firm a member of the SEC Practice Division of the AICPA? (check one)

_____ Yes
_____ No

(7) Area of specialization: (Check one)

_____ Audit
_____ Tax
_____ Management Advisory Services
_____ Other (please specify)

APPENDIX B

DEMOGRAPHIC DATA MODIFICATIONS

APPENDIX B

DEMOGRAPHIC DATA MODIFICATIONS

Demographic Variable	Raw Data Code	Raw Data Description	Data Modification: Change in Coding	Revised Coding Code	Revised Coding Description
Age	1	Under 25	Combine 1 & 2	1	Under 30
	2	25-29	Combine 7 & 8	2	30-35
	3	30-35		3	36-40
	4	36-40		4	41-45
	5	41-45		5	46-50
	6	46-50		6	Over 50
	7	51-55			
	8	Over 55			
Audit Experience	1	Less than 5 years	Combine 4, 5	1	Less than 5 years
	2	6-9 years		2	6-9 years
	3	10-13 years		3	10-13 years
	4	14-17 years		4	Over 13 yrs.
	5	Over 17 years			
CPA Firm Size	1	Ntl. Firm--Major Office	Combine 1, 2, 3	1	Ntl. Firm
	2	Ntl. Firm--Satellite	Combine 4, 5	2	Regional/Local
	3	Ntl. Firm--Non Major Office			
	4	Regional Firm			
	5	Local Firm			
Staff Position	1	Staff Acct.	Combine 1, 2, 3	1	Staff,Senior
	2	Senior--little supervisory exp.		2	Supervisor
	3	Senior--Substantial supervisory exp.		3	Partner
	4	Supervisor			
	5	Partner			
Academic Degrees	1	High School	Eliminate 1	1	Bachelors
	2	Bachelors	Combine 3, 4	2	Grad. Degree
	3	Masters			
	4	Other			
Specialization	1	Audit	Combine 2, 3, 4	1	Audit
	2	Tax		2	Other
	3	Mgmt. Advisory			
	4	Other			

APPENDIX C

STATISTICAL SUMMARIES

APPENDIX C

MEAN RESPONSES FOR EXPERIMENTAL GROUPS

	Experimental Groups*							
Judgment	1	2	3	4	5	6	7	8
McAllister, Inc.:								
Audit Decisions:								
Audit Adjustment	5.25	4.33	3.75	4.63	4.14	3.57	4.33	4.22
Footnote Disclosure	2.75	3.11	4.50	3.75	4.71	4.29	4.00	3.44
Qualified Opinion	5.63	5.33	5.33	4.50	5.29	5.14	5.67	5.75
Cue Weighting:								
Materiality	1.88	2.33	1.67	1.88	3.29	2.71	2.17	2.33
Client Objections	4.43	4.67	4.22	4.43	4.43	5.00	5.33	4.56
GAAP	2.29	1.89	1.86	2.13	2.29	2.14	2.67	1.89
Winslow, Co.:								
Audit Decisions:								
Audit Adjustment	3.11	3.78	4.43	3.56	3.75	3.50	3.29	4.50
Footnote Disclosure	4.33	4.00	4.86	4.56	3.13	5.17	4.83	4.63
Cue Weighting:								
Materiality	2.56	3.11	2.57	2.11	2.63	2.67	3.00	2.13
Client Objections	3.75	4.67	4.57	4.44	4.00	4.67	5.00	4.50
GAAP	1.75	1.78	1.86	2.44	2.75	1.50	1.71	2.13

*Experimental Groups:

Independent Variable	1	2	3	4	5	6	7	8
Client Size	Large	Large	Large	Large	Med.	Med.	Med.	Med.
Client Association	Long	Long	Short	Short	Long	Long	Short	Short
Growth Pattern	Strong	Stable	Stable	Strong	Strong	Stable	Stable	Strong

Response Range:

Audit Decisions	1-7	yes to no
Cue Weighting	1-6	Most Important Factor to Insignificant

APPENDIX C

List of Variables*

Variable Name	Description
	McAllister, Inc.:
	Audit Decisions
AD1	Audit Adjustment
F1	Footnote Disclosure
Q	Qualified Opinion
	Cue Weightings
M1	Materiality
O1	Client Objections
P1	Accounting Principles
	Winslow Co.:
	Audit Decisions
AD2	Audit Adjustment
F2	Footnote Disclosure
	Cue Weightings
M1	Materiality
O1	Client Objections
P1	Accounting Principles
	Demographic Factors:
A	Age
E	Audit Experience
FS	CPA Firm Size
SP	Staff Position (Level)
D	Academic Degrees
M	Membership in SEC Firms Practice Division
S	Area of Specialization

*Scale of Variables:

Name	Range Numerical	Description
AD1, F1, Q, AD2, F2	1-7	yes - no
M1, O1, P1, M2, O2, P2	1-6	Most significant
A, E, FS, SP, D, M	See Appendix B	factor-Insignificant

APPENDIX C

Correlation Matrix of Variables
(Pearson Correlation Coefficients)

	Audit Judgment[a]																
	AD1	F1	Q	M1	O1	P1	AD2	F2	M2	O2	P2	A	E	FS	SP	D	M	S
AD1		-.73[b]	.10	-.25[c]	-.13	.30[b]	.12	-.19[d]	-.08	-.11	.07	.09	.14	.20[d]	.03	-.28[c]	.10	-.16
F1			-.00	.35[b]	.24[c]	-.03	-.23[c]	-.27[c]	.17[d]	-.03	-.01	-.06	-.07	-.22[c]	-.05	.24[c]	-.11	.15
Q				-.10	.08	.19[d]	-.05	.06	-.01	.00	.01	.04	.11	.06	.27	-.13	-.05	-.10
M1					.07	.13	-.11	.21[c]	.52[b]	-.03	.12	.04	.01	-.12	.02	.02	-.18[d]	-.09
O1						.28[c]	-.05	.21[c]	.09	.49[b]	.21[c]	.12	.05	-.20[d]	.00	.14	-.07	.22[c]
P1							-.06	-.11	.08	.08	.40[b]	-.03	.07	.05	.11	-.13	.04	.10
AD2								-.64[b]	-.30[b]	-.16	.27[c]	.25[c]	.11	.34[b]	.07	-.14	.17	.04
F2									.34[b]	.18[d]	-.34[b]	-.17	-.01	-.34[b]	-.05	.24[c]	-.28[c]	-.07
M2										.21[d]	-.12	-.06	-.05	-.15	.01	.00	-.09	.19[d]
O2											-.20[d]	.11	.20[d]	-.06	.19[d]	.03	-.06	.03
P2												.10	.05	.16	.09	-.08	.16	.07
A													.85[b]	.18	.33[b]	-.03	.15	.02
E														.12	.56[b]	-.12	.01	-.19[d]
FS															.32[b]	-.17[d]	.66[b]	-.10
SP																-.20[d]	.18[d]	-.31[b]
D																	-.15	.16
M																		.03

[a] See List of Variables in Appendix C
[b] $P \leq .01$
[c] $P \leq .05$
[d] $P \leq .10$

APPENDIX C

Correlation Matrix of Audit Judgments And Environmental Factors (Pearson Correlation Coefficients)

Environmental Factors[d]	Audit Judgment[a] AD1	E1	O	M1	O1	P1	AD2	F2	M2	O2	P2
Client Size	-.10	.13	.07	.27[b]	.17[c]	.07	.03	-.01	-.01	.05	.04
Association	-.03	.06	-.02	-.21[b]	-.02	-.01	.10	.14	-.14	.13	.04
Client Growth	-.14	.07	-.02	-.05	-.13	-.01	.01	.11	.20[c]	.21[b]	-.24[b]

[a] See List of Variables in Appendix C

[b] $p \leq .05$

[c] $p \leq .10$

[d] Scale of Environmental Factors

Factor	Levels (Numerically . . . 1 or 2)
Client Size	Large or Medium
Association	Long (11-13 years) or Short (2-3 years)
Client Growth	Strong or Stable

experimental setting. Comments received during the review and pilot stages of the study further corroborated the perceived high degree of realism of the cases. Several subjects stated that a given case, for example, "was like one I had to deal with just last year."

As noted earlier, an important problem in this study was selecting key environmental factors for examination that appear to be significantly relied upon by auditors in decision making. The review of the literature in Chapter II suggested that such factors (heuristic rules) are common in complex decision situations. If minor or inconsequential independent variables are investigated, the resources expended on the project are largely wasted and the findings provide little contribution. The determination of the environmental factors is, therefore, a crucial decision. The approach taken was to choose environmental variables that are frequently mentioned in the literature as vital cues employed by auditors. Because this is one of the few experimental studies in this area, it is expected that future research will reveal other, perhaps more important, environmental cues that are considered heavily by CPA s in audit judgments. The approach employed in selecting the environmental variables for this study appeared to be optimal considering the early stage of the research on this issue.