

Auditor Consideration of Tone-at-the-top in Audit Planning: An Experimental Investigation

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The objective of this study is to increase our understanding of the manner in which auditors integrate information about management tone-at-the-top with other information when making audit planning decisions related to extent of substantive testing. Audit planning is an area that requires considerable professional judgment and involves the evaluation and integration of a wide range of information, such as the client's internal environment including both tone-at-the-top and internal controls, planning phase analytical procedures (PPAP), and characteristics of the client's business and the industry in which it operates. This research provides evidence that auditors do consider tone-at-the-top during the audit planning process and that this information is integrated with other relevant factors in extent-of-substantive-testing judgments.

We use a complex task (Bonner 1994; Kennedy, et al. 1997) providing cues across several dimensions, including client tone-at-the-top, results of internal control tests and PPAP, and various client characteristics to study planned extent-of-substantive-testing judgments made by auditors. One goal is to determine whether auditors integrate information about tone-at-the-top during audit planning into subsequent extent-of-substantive-testing judgments. In addition, we determine how tone-at-the-top interacts with other relevant factors in audit planning.

To our knowledge, this is the first study to specifically address tone-at-the-top as a planning consideration within the audit risk model and to operationalize this variable within an experiment along with tests of controls. Previous studies operationalized internal control only as results of control tests (Cohen and Kida 1989; Dusenbury, et al. 2000), or only as control

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philosophy (Cohen and Hanno 2000). This decreases the external validity of those studies, especially in light of recent focus on management tone-at-the-top, while our study addresses both of these aspects together. Anecdotally, we are aware of partners and managers from international accounting firms considering management “tone” issues during audit planning. Additionally, we are aware of one former international accounting firm that required formal documentation of the internal environment and management “tone” during planning-phase risk assessments. Finally, the COSO framework suggests the importance of risk management and control through the internal environment and consideration of management tone-at-the-top (COSO 1992). For all of these reasons, it is important that this factor be addressed and studied in the research literature on audit planning.

We report the results of an experiment that examines the manner in which practicing auditors integrate several factors when forming decisions concerning the appropriate extent of substantive testing. Thirty-seven auditors from a large, international accounting firm completed a series of cases describing a hypothetical company. Four factors were manipulated in the study in a digram-balanced, Latin square design. The factors manipulated were tone-at-the top, results of control tests, results of PPAP, and business stability. Participants were asked to estimate the extent of substantive testing necessary to complete the audit of accounts receivable for each scenario. We predict that auditors will synthesize information about tone-at-the-top, results of control tests, and business stability in determining the effect of PPAP on planned extent of substantive tests. In addition, we expect the combination of favorable results in these factors will create a substantial reduction in the planned extent of substantive tests. Our results reveal a significant three-way interaction among the tone-at-the-top, results of tests of internal control, and results of PPAP variables. As predicted, this suggests that auditors do consider tone-at-the-top in combination with other relevant factors in planning the extent of substantive testing and that favorable combinations of these factors produce substantial decreases in the planned extent of substantive tests.

This study provides an additional important contribution to the auditing literature by allowing investigation of tone-at-the-top as a pervasive internal control factor that is different from testing the design and operating effectiveness of individual controls. Our study suggests that auditors do consider this information in a manner that would be consistent with the audit risk model. In addition, auditors do consider factors that would be a part of the fraud triangle when placing reliance on their PPAP. Prior research on audit planning has generally focused on the effects of one or two variables on auditors' audit planning judgments (Beaulieu 2001; Maletta 1993; Wright and Bedard 2000) or on revisions of planning decisions once additional information is revealed (Dusenbury, et al. 2000; Houston, et al. 1999). Although not a criticism of these prior studies, they were not able to investigate the potential lower- and higher-order interactive effects of those variables with other relevant factors. This study investigates an additional operationalization of internal control—tone-at-the-top—within the framework of the audit risk model and investigates higher-order interactive effects. This factor is especially important because poor tone-at-the-top has been identified as a contributing factor in most major corporate frauds.

The remainder of the paper is organized into four sections. The next section discusses the relevant literature related to the development of our hypotheses. The third section discusses the experimental method and procedures followed in the experiment. The fourth section presents the study's results. The final section summarizes the study and presents its conclusions, including interpretation of the results and implications of this research.

HYPOTHESIS DEVELOPMENT

In a recent article expounding on one new audit approach, Peecher et al. (2007) discuss the contemporary audit ecology and the effect of business complexity on audit risk. Peecher et al. (2007) list four dimensions that are characteristic of the modern audit environment. These are summarized below:

- Accelerated change and new business models and strategies to deal with reduced barriers to competition
- Heightened concern about /responsibility for detecting management fraud
- Audit failures result from a failure to manage and understand business states and management incentives, not from a failure to sample enough transactions
- The Audit Risk Model (ARM) remains as a key planning tool

These four dimensions emphasize the importance of changes in business complexity, risk of fraud, ability to detect fraud, and highlight the continued importance of the traditional audit risk model within audit planning. In light of these factors, we believe that studying tone-at-the-top as a red flag for fraud and for potential audit failure is an important area of study. We discuss the implications of tone-at-the-top in terms of the ARM and auditor extent-of-substantive-testing decisions. Finally, we focus on PPAP as part of the stream of literature on the ARM and the combination of these cues in relation to the professional literature.

Tone-at-the-top and the Fraud Triangle

“The cornerstone of an effective antifraud environment is a culture with a strong value system founded on integrity” (AICPA 2002). In recent years, “tone-at-the-top” has received significant press as a way to lessen or at least evaluate the possibility of management fraud. In the many case studies on fraud in business and accounting, there has been a consistent failure on the part of management to set an appropriate ethical tone (See Mintz and Morris (2008) for an extensive review). The Sarbanes-Oxley Act of 2002, the Public Company Accounting Oversight Board’s proposed Auditing Standard #5, Statement on Auditing Standards (SAS) No. 99, and the COSO Enterprise Risk Management model all suggest that management tone-at-the-top is an important factor in reducing fraud (AICPA 2002, COSO 2004, PCAOB 2007).

The term “tone-at-the-top” has been used for at least two decades to describe a key concept in governance and control. In 1987, the National Commission on Fraudulent Financial

Reporting defined tone-at-the-top when issuing its recommendations for preventing and detecting fraudulent financial reporting:

“The tone set by top management—the corporate environment or culture within which financial reporting occurs—is the most important factor contributing to the integrity of the financial reporting process. Notwithstanding an impressive set of written rules and procedures, if the tone set by management is lax, fraudulent financial reporting is more likely to occur.” (National Commission on Fraudulent Financial Reporting 1987).

Five years later, the Committee of Sponsoring Organizations of the Treadway Commission (COSO) referred to the importance of the “tone-at-the-top” in its report titled *Internal Control—Integrated Framework* when describing management’s responsibility for maintaining a positive control environment. The control environment is one of five components of internal control and is defined as follows:

The control environment sets the tone of an organization, influencing the control consciousness of its people. It is the foundation for all other components of internal control, providing discipline and structure. Control environment factors include the integrity, ethical values and competence of the entity’s people; management’s philosophy and operating style; the way management assigns authority and responsibility, and organizes and develops it people; and the attention and direction provided by the board of directors.” (COSO 1992).

Professional auditing standards (SAS No. 55, 78, 94, and 99) require auditors to evaluate the client’s control environment when planning the audit. As stated in AU 319.35, “The auditor should obtain sufficient knowledge of the control environment to understand management’s and the board of directors’ attitude, awareness, and actions concerning the control environment...” The basic premise is that if top management is not acting appropriately and providing an example of appropriate behavior, it is unreasonable to expect that lower-level managers will engage in appropriate behavior. Assuming lower-level employees do follow established rules, if management feels it is “above the law,” then override of controls is more likely to take place. The well-known fraud triangle lists incentives/pressure, opportunity, and attitude/rationalization as three factors associated with the occurrence of fraud. Poor tone-at-the-top indicates that management may be more willing to rationalize their behavior or not implement and enforce

effective controls. Employees without positive ethical guidelines and role models may easily rationalize that fraudulent behavior is acceptable or that “everyone is doing it.”

The AICPA’s Management Antifraud Programs and Controls: Guidance to Help Prevent, Deter and Detect Fraud (AICPA 2002), lists three recommendations for the deterrence of fraud:

- Creating a culture of honesty and high ethics (setting the tone-at-the-top)
- Evaluating antifraud processes and controls
- Developing an appropriate oversight process

In the current study, we focus on the first of these, looking specifically at tone-at-the-top. We feel this focus is justified as nearly 70% of the enforcement matters studied in the Report Pursuant to Section 704 of the Sarbanes-Oxley Act of 2002 resulted in charges against at least one member of senior management (SEC 2003). With frauds such as Enron, Worldcom, and HealthSouth in recent memory, many people may have been left wondering whether auditors consider tone-at-the-top when planning and performing the audit. Management at these companies felt that they could override controls and were able to rationalize their actions. In addition, management was under pressure to make earnings targets (SEC 2003) and/or maintain their current lifestyle. Dunn (2003) performed an archival study suggesting that poor control philosophy is associated with fraud, and we extend this literature by addressing whether auditors consider tone-at-the-top as part of audit planning decisions.

While changes in audit methodology have been suggested as partially responsible for these audit failures (Cullinan and Sutton 2002; Weil 2004), others have suggested that even more detailed testing would not have helped “catch the crooks” (Peecher, et al. 2007). Although traditional audit procedures may have indicated that controls were in place and operating effectively and the financial statements were supported, management fraud would have been concealed by the perpetrators by changing the accounting records. For these reasons, traditional tests of controls and detail tests may not uncover instances of fraud (Peecher, et al. 2007).

Tone-at-the-top has been stressed as one of the primary ways to reduce fraud and improve financial reporting. From the perspective of an independent auditor, companies that have appropriately adopted a strong and ethical tone-at-the-top would seemingly have less chance of an audit failure. Therefore, we propose that auditors do incorporate information about management tone-at-the-top into their planning decisions and that this is done within the framework of the audit risk model.

The Audit Risk Model

One form of the audit risk model is as follows (AICPA 1998):

$$\text{Audit Risk} = \text{Inherent Risk} \times \text{Control Risk} \times \text{Detection Risk}$$

At the account level, inherent risk is the risk of a material misstatement in the account balance without regard to internal controls (AICPA 1998). Control risk is the risk that the internal controls of the company would not detect a material misstatement present in the account (AICPA 1998). Together, inherent risk and control risk comprise the risk of material misstatement (whether caused by error or fraud) at the account balance level (AICPA 2006). Auditors should consider the risk of material misstatement in individual accounts when planning the audit, as this risk is relevant in determining the appropriate extent, nature, and timing of substantive tests of account balances. Detection risk is the risk that the auditor's substantive tests will not detect a material misstatement that is present in the account (AICPA 1998).

Tone-at-the-top theoretically falls under the category of control risk, as tone is a pervasive control that underlies all of the general and application controls that could be put in place by a company. However, in assessing the control environment, auditors have to do several things. They must assess the design and the operating effectiveness of controls, which will usually be done in the form of documenting and testing the controls put in place by the company. Most recently, this has been done as part of audits of internal control over financial reporting required by Section 404 of the Sarbanes-Oxley Act. Beyond these tests, however, auditors must also assess possible management override and enforcement of these controls as manifested by the

tone-at-the-top. In short, auditors must be skeptical of the internal environment beyond what client documentation and tests provide as evidence. More subtle indicators, such as management aggressiveness on financial issues and willingness (or unwillingness) to work with the auditors, should also be considered.

It is possible that an auditor's tests of controls could indicate that controls are designed and operating effectively, while management gives indications that tone-at-the-top may not be favorable. For instance, if management overrides controls, changes account balances inappropriately, or gives indications that they are not subject to the same checks as other employees, then the auditor's assessment of control is extremely limited. On the other hand, it is also possible for the tone-at-the-top to be favorable while weaknesses are present in the operating effectiveness of certain key controls. This may be especially true for smaller companies as suggested by the Public Company Accounting Oversight Board's *Auditing Standard #5* (PCAOB 2007).

Management tone-at-the-top is more difficult for the independent auditor to assess than performing simple tests of the operating effectiveness of controls. The auditor must assess many cues from management about how they handle and address accounting issues. Indications may be subtle, such as always taking a technically acceptable, but aggressive, stance on accounting issues. Alternatively, management may be outwardly uncooperative with the auditors and hostile regarding audit findings. Also, consistently finding that accounts are misstated could indicate an unfavorable tone in terms of management's failure to correct control weaknesses, hiring of incompetent personnel, or disregard for proper accounting policies.

In this study, we operationalize the internal control variable on two levels to account for the reality of the assessment of internal controls as both a pervasive management issue and as a test of the actual implementation of controls. The goal of this two-pronged operationalization is to determine whether auditors consider both facets of internal control and to expand the research

literature to include both types of variables. Based on the audit risk model, tone-at-the-top, and our operationalization of control risk, we hypothesize and test the following:

H1: Auditors consider tone-at-the-top, over and above results of control tests, when making extent-of-substantive-testing judgments.

Planning Phase Analytical Procedures

Authoritative auditing standards require auditors to perform analytical procedures in planning the audit (AICPA 1988b). An important objective of these procedures is to identify the existence of unusual amounts, ratios, or transactions that might indicate a risk of material misstatement due to fraud or error. The results of planning phase analytical procedures should be considered together with other information obtained by the auditor in identifying the risks of material misstatement (AICPA 2002).

Planning phase analytical procedures (PPAP) are useful for improving both audit effectiveness and audit efficiency. As auditors perform these procedures, they are better able to determine how to focus their efforts during the audit. The numbers used to calculate the analytics, however, are only as good as the system that produces them (Bedard, et al. 1999). Therefore without proper controls in place, or with indications of poor tone-at-the-top, the value of the inferences drawn from these procedures is suspect.

If tests of operating effectiveness suggest control problems, then the resultant analytics will not provide the desired level of predictability. The same should be true of indications of tone-at-the-top. If there are indications of poor tone-at-the-top manifested as disregard for control procedures, aggressive accounting practices, and/or disagreements with the auditors, the trustworthiness and value of PPAP are questionable. Alternatively, in an environment where management enforces controls, acts conservatively in response to accounting measures, and is responsive to auditors and their findings, auditors should have greater confidence in the trustworthiness of the PPAP. This leads to our next hypotheses:

H2: The results of planning phase analytical procedures will have a larger absolute effect on extent-of-substantive-testing judgments when the results of control testing are favorable than when they are unfavorable.

H3: The results of planning phase analytical procedures will have a larger absolute effect on extent-of-substantive-testing judgments when the tone-at-the-top is favorable than when it is unfavorable.

In addition, Statement on Auditing Standards No. 56 suggests an interactive effect between analytical procedures and the business environment, as the effects of planning phase analytical procedures on auditors' judgments of the appropriate extent of tests of details of balances may depend on the degree of stability in the client's business environment:

It is important for the auditor to understand the reasons that make relationships plausible because data sometimes appear to be related when they are not, which could lead the auditor to erroneous conclusions... As higher levels of assurance are desired from analytical procedures, more predictable relationships are required to develop the expectation. Relationships in a stable environment are usually more predictable than relationships in a dynamic or unstable environment (AICPA 1988b).

If the results of analytical procedures are favorable in a relatively stable business environment, then the auditor's level of confidence in those results should be greater than if the business environment were volatile. This interactive effect would result from the auditor's greater confidence in his or her initial expectation, which in turn results from the greater predictability of relationships in the stable environment. This leads to our next hypothesis:

H4: The results of planning phase analytical procedures will have a larger absolute effect on auditors' extent-of-substantive-testing judgments when the business environment is stable than when it is volatile.

The latter three hypotheses predict ordinal interactions between planning phase analytical procedures and (a) results of tests of controls, (b) tone-at-the-top, and (c) business stability. In the following section, we describe the experiment used to test the above hypotheses.

METHOD

An experiment was performed to explore the nature of the potential relationships discussed above. A partner in a large, international public accounting firm assisted in securing participants for the study and in administering the instrument to participants within the firm. The partner was asked to seek the cooperation of audit seniors and managers with experience in audit planning. To ensure the task was taken seriously, the partner delivered the instrument to each participant, and participants returned the instrument to the partner when finished. Forty auditors received a copy of the instrument. Seventeen audit managers and 20 audit seniors turned in completed instruments. Demographic information about the participants is provided in Table 1 . (See Appendix A, Table 1).

Each participant received three booklets. Booklet one contained instructions to the experiment and background data about the audit client. Although the client was a fictional company, it was modeled after an actual manufacturing company. Booklet two contained the audit planning cases and response scales. Booklet three contained a debriefing questionnaire.ⁱ Participants completed the cases at their own pace and returned the booklets directly to the partner.

Independent and Dependent Variables

Information about four factors was manipulated in the experiment: results of control tests, planning phase analytical procedures, business stability, and tone-at-the-top. The levels of each of these factors were varied dichotomously such that the factor was either favorable or unfavorable. To enhance the realism of the case, summary ratio analyses and a short internal control questionnaire were used in the actual materials. A summary of the key differences in information manipulations is shown below.

We manipulated the tone-at-the-top factor to emphasize, in particular, certain fraud “red flags” and items that could indicate issues with management tone. Specifically, we ensured that

the participants knew explicitly about the level of aggressiveness of accounting practices, competence of employees, and willingness to cooperate with the auditors. In a 2000 study supported by the AICPA, forensic experts classified many different management fraud risk factors (Apostolou, et al. 2000). In the area of opportunity, strained management/auditor relationship was listed as a fraud risk factor.

The **tone-at-the-top factor** was manipulated as follows:

- Client management is very cooperative with the auditors, follows conservative accounting practices, has competent employees, and last year's audit revealed no material misstatements in receivables (favorable tone/low fraud-risk condition).
- Client management is uncooperative with the auditors, follows aggressive accounting practices, has rather incompetent employees with a high turnover rate, and last year's audit revealed several material misstatements in receivables (unfavorable tone/high fraud-risk condition).

Related to the internal controls, we provided indications of the operating effectiveness of control activities associated only with accounts receivables. Thus, the internal control factor did not directly overlap with the tone-at-the-top factor. While the internal control factor relates more directly to issues of appropriateness of design and operating effectiveness mandated by the Sarbanes-Oxley Act, our tone factor focused on the underlying pervasive issue of management internal environment. We manipulated our **operating effectiveness of internal control factor** as follows:

- Information about internal controls indicates the client's control system over receivables is effective (strong controls condition).
- Information about internal controls suggests the internal control system over receivables has serious weaknesses (weak controls condition).

We indicated the results of PPAP in a straightforward manner. The following was used in our manipulation of the **planning phase analytical procedures (PPAP) factor**:

- Results of four planning phase analytical procedures reveal no indications of material misstatements in receivables (favorable results condition).
- Results of four planning phase analytical procedures suggest the possible presence of material misstatements in receivables (unfavorable results condition).

According to authoritative auditing standards, “In planning the examination, the auditor should consider ... matters relating to the entity’s business and the industry in which it operates” (AICPA 1978). Such matters include, among others, the type of business, capital structure, changes in technology, financial trends and ratios, and profitability. Characteristics of the client’s business and its financial condition may affect the risk of material misstatement and influence audit planning in multiple ways. For instance, as the degree of stability in the client’s business environment, profits, and/or financial condition decline, management may come under increased pressure to improve the company’s performance or to intentionally misstate the financial statements in order to improve the appearance of the company’s financial condition. As the auditor obtains an understanding of the client’s business environment and financial condition, the auditor is better able to assess the risks of material misstatement (AICPA 2006). Based on the audit risk framework, the auditor’s assessment of the risks of material misstatement is directly related to the planned extent of substantive testing.

Similarly, the stability of the client’s business and financial condition may affect the auditor’s business risk. Business risk, in turn, can influence audit planning through its effect on the auditor’s acceptable level of audit risk, which according to the audit risk model, has an inverse effect on the extent of substantive tests. For instance, when the client is operating in a highly volatile industry, the auditor will want additional protection against the risk of issuing an incorrect opinion because of perceived high levels of business risk. Thus, acceptable audit risk

may be set lower (more stringently), ultimately affecting detection risk and the nature, extent, and/or timing of substantive audit tests (Brumfield et al. 1983).

We manipulated business stability by varying the nature of the company's business and industry, as well as its financial condition. Specifically, the manipulations of the **business stability factor** are as follows:

- Client is a privately held manufacturer of lighting fixtures, has been in business for 66 years, and profits have been stable with a gradual increasing trend (stable business environment, low likelihood of client financial difficulty).
- Client is a manufacturer of audio compact disc players, has been in business for three years, is expecting to go public within the next year, and profits have been irregular with a declining trend (volatile business environment, high likelihood of client financial difficulty).

Information about this factor was presented as part of the background information in booklet one and did not vary for a given participant. Information about the client's tone-at-the-top, results of tests of controls, and PPAP was presented as part of each case, and these factors were operationalized as repeated-measures variables, producing eight audit planning cases per participant (2 x 2 x 2).^{ii, iii} A digram-balanced, Latin square design was used to systematically counterbalance the order in which each participant received the stimulus combinations (Wagenaar 1969). This was done to control for possible practice effects. Participants were assigned to treatment conditions randomly.

As discussed previously, the professional auditing literature indicates that auditors' evaluations of each of the manipulated factors are important in audit planning, as each factor should be used in the auditor's assessment of the appropriate extent of tests of details of balances. Consideration of management tone-at-the-top is important as evidenced by recent authoritative guidance. Other potentially relevant matters were held constant in the background information provided to participants (e.g., financial statement balances, size of the company).

For each case, participants were asked to consider the background information presented in booklet one along with the additional information provided in the case and indicate the amount of testing on a Likert-type scale anchored at “no testing” (1) and extensive testing (9). These extent-of-substantive-testing judgments served as the dependent variable in the design. In addition, the total number of hours the participant would plan for substantive tests of details of the client’s accounts receivable balance was collected.

Prior to administration of the experiment, the instrument was pilot tested using 42 accounting students enrolled in an undergraduate auditing course. In addition, an auditing professor at a university in the United States provided an in-depth review of the instrument. The pilot test and review resulted in minor changes to the instructions and presentation format of the cases. Following this, an audit manager in the CPA firm involved in the study reviewed the instrument to ensure consistency between the terminology used in the instrument and terminology used by the firm. Several changes in the wording of the instructions, background information, and debriefing questionnaire emerged from this review. These changes were deemed desirable so as to minimize the risk that participants might misunderstand any part of the instrument.

RESULTS

Cell means and standard errors for participants’ extent-of-substantive-testing judgments for accounts receivable are presented in Table 2. In all cases, participants’ planned extent of substantive testing was greater when tone-at-the-top was unfavorable than when it was favorable, *ceteris paribus*. Similarly, the planned extent of substantive testing was greater when results of tests of controls were unfavorable than favorable. For the PPAP factor, extent of substantive testing was higher when the results of PPAP were unfavorable than when they were favorable. Although business stability was manipulated in the experiment, results show that the auditors did not change their proposed extent of substantive testing of accounts receivable based on this

factor.^{iv} Thus, for all variables other than business stability, the pattern of results is as expected. (See Appendix A, Table 2).

To examine the overall relationship among participants' extent-of-substantive-testing judgments and the manipulated variables, repeated measures ANOVA was performed. We used participants' extent-of-substantive-testing judgments as the dependent variable with tone-at-the-top (tone), results of control tests (control), planning phase analytical procedures (PPAP), and business stability (BS) as the independent variables.^v Results of the ANOVA are presented in Table 3.^{vi} (See Appendix A, Table 3).

The results of the ANOVA reveal a statistically significant ($F = 9.12$, $P = .005$) three-way interaction among Tone, Control, and PPAP. These results indicate that auditors do consider information garnered during planning related to tone-at-the-top, and integrate that information with other factors, as suggested by the authoritative literature. The ANOVA results support H1, which states that auditors do consider tone-at-the-top when making extent-of-substantive-testing decisions.

The three-way interaction must be decomposed and analyzed before conclusions can be reached regarding the lower-order relationships hypothesized in H2, H3, and H4 (Keppel 1982). The professional literature on tone-at-the-top suggests that it will have a pervasive effect on the control environment and therefore should influence the effects of other indicators, such as results of control tests and results of PPAP. To examine the relationships among these factors, the three-way interaction was decomposed into two pairs of two-way interactions.

First, we examine the two two-way interactions between control and PPAP—one at the unfavorable level of tone, and another at the favorable level of tone. The interaction between control and PPAP given unfavorable tone is insignificant at standard significance levels. In contrast, when tone is favorable, the interaction between control and PPAP is significant ($P < .05$). The nature of the interaction is depicted in Panel A of Figure 1 for unfavorable tone and Panel B of Figure 1 for favorable. As implied by the authoritative literature, the effectiveness of the

internal control system will moderate the extent to which auditors are influenced by the results of analytical procedures when planning the extent of substantive testing. We find, however, that tone-at-the top is a critical factor that drives auditor willingness to decrease planned extent of substantive testing. This suggests that auditors can take advantage of the favorable information in the PPAP to a greater extent when internal control signals are consistently good as evidenced by favorable tests of controls coupled with a favorable tone-at-the-top. (See Appendix B, Figure 1).

Next, we further decomposed the three-way interaction into two two-way interactions between PPAP and tone—one at the unfavorable level of control, and another at the favorable level of control. When control is unfavorable, the interaction between PPAP and tone is statistically insignificant. However, when control is favorable, the interaction between PPAP and tone is statistically significant ($P < .05$). Thus, we find support for H2 and H3. (See Appendix B, Figure 2).

When tone-at-the-top is favorable, the auditor's confidence in the reliability of PPAP appears to vary with the effectiveness of internal controls. Similarly, when the results of tests of control are favorable, the auditor's confidence in PPAP appears to vary with tone-at-the-top. When controls are strong and tone-at-the-top is favorable, then an increase in the favorableness of the PPAP motivates the auditor to reduce his or her extent of substantive testing by a greater amount than when either tone-at-the-top or results of tests of controls are unfavorable. Again, all three items must be favorable before a critical combination of evidence is obtained. When all three items are favorable, their joint effect on the reduction in detailed testing is greater than the sum of their individual effects. However, when any of the items are unfavorable, then the effects of the others are attenuated.

Hypothesis 4 predicted that the results of planning phase analytical procedures would have a larger effect on auditors' extent-of-substantive-testing judgments when the business environment was stable than when it was volatile. To test this hypothesis, we examined the two-

way interaction between PPAP and BS (see Appendix A, Table 3). This interaction was not statistically significant ($P=.78$). Therefore, no support is found for H4.

In summary, when the tone-at the top, results of tests of internal control, or PPAP indicate a high likelihood of misstatements, then the effects of other factors on auditor extent-of-substantive-testing judgments are attenuated. This is consistent with evidence in the psychology literature that has found unfavorable information tends to be weighted more heavily than favorable information (Anderson and Alexander 1971; Hamilton and Wright 1982; Hodges 1974). However, when all three factors indicate a low likelihood of misstatements, their combined effect *exceeds* the sum of their individual effects on auditors' decisions to reduce the extent of substantive tests.

SUMMARY AND CONCLUSIONS

This study investigates auditors' extent-of-substantive-testing judgments. Interactive relationships among risk factors identified in the auditing and control environment literatures as relevant to audit planning are explored. The factors examined are tone-at-the-top, results of control tests, planning phase analytical procedures, and business stability.

Results reveal the existence of a significant three-way interactive relationship among the tone-at-the-top, results of control tests, and planning phase analytical procedures. Although the existence of a three-way interaction among these factors is not presupposed in the audit risk model, the patterns of the lower-order interactions are consistent with two-way interactive relationships suggested by authoritative guidance such as the COSO (1992) report and professional auditing standards. We find that auditors do consider tone-at-the top in combination with other factors during audit planning as part of their judgment about the appropriate extent of substantive testing. Additionally, we find that the critical combination of three favorable factors significantly decreases the planned extent of substantive testing.

This study is subject to several limitations related to external and interval validity. As with any experiment, results may be generalized only to the extent that the participants and situations used in the study are representative of actual scenarios. In the case of the current study, participants were from one large, international accounting firm. While other large, international public accounting firms would likely have similar procedures, differences in interpretation of auditing standards and in firm procedures could cause different results. In addition, the use of an experiment reduces external validity by the very nature of the controlled environment. While the scenarios used in the current study represent only a small portion of possible audit situations, pilot testing and review of these materials provides evidence that the cases are realistic. Additionally, participants indicated that they felt the case was realistic overall.

Regarding internal validity, if systematic differences exist in the environmental conditions in which an experiment is administered across groups of participants receiving different treatments, these differences may produce confounding variables which limit the experiment's internal validity. Examples of environmental differences might include better lighting, fewer distractions, more comfortable temperature, differences in the time of day during which the experiment was completed, etc. In the current study, participants were allowed to complete the cases in their own office at their own pace; therefore, each participant completed the experiment under somewhat different conditions than other participants. While we acknowledge the possibility these different conditions may have produced extraneous variables, we believe it is unlikely they had a material effect on the interactive or main effects observed in this study. First, it is unlikely these differences occurred systematically across the different treatment groups, particularly since participants were assigned to treatment groups randomly. Second, the nature of the dependent variable—decisions regarding the extent-of-substantive-testing—should be relatively robust with respect to variations in environmental conditions such as lighting, temperature, or time of day. However, to the extent that any variations in participants' substantive-testing decisions were caused by differences in environmental conditions across

participants, then the error terms in our ANOVA tests would be inflated, reducing the likelihood of finding statistically significant results.

This study makes several contributions to the audit research literature and to accounting practice. First, for research, this study includes an additional operationalization of internal control into the audit literature as tone-at-the-top, along with a more traditional measure of the results of control tests. Investigation of this variable is important as there is anecdotal evidence that auditors consider this factor, and there is significant professional guidance suggesting that there should be increased attention to the tone-at-the-top. In addition, this study's findings are consistent with findings in the configural cue processing literature, suggesting that auditors do process information in a configural manner when appropriate. Finally, related to practice, the results of this study indicate that auditors do indeed consider tone-at-the top in their extent-of-substantive-testing decisions and integrate their consideration of tone-at-the-top with other factors relevant to audit planning, including the results of tests of controls and results of planning phase analytical procedures.

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Appendix A

Table 1
Descriptive Statistics

Variable	N*	Mean	Standard Deviation	Range	
				Minimum	Maximum
Years of Experience	37	5.54	2.83	3	13
Extent of Audit Procedures	37	2.95	0.78	2	4
Quality of Estimate	37	3.35	0.59	2	4
Risk Preference	37	3.02	0.87	1	4
Realism	37	2.03	0.69	1	3
Minutes to Complete	32	57.25	17.86	30	120

Years of Experience is the number of years of experience (rounded to the nearest year) working as an auditor as reported by the participant.

Extent of Audit Procedures is the self-assessment by the participant of whether they tend to perform more or less extensive procedures compared with other auditors. 1= Much more extensive, 2= Somewhat more extensive, 3= About the same as most other auditors, 4= Somewhat less extensive, and 5= Much less extensive.

Quality of Estimate is a self-report by the participant of whether they tend to over- or under-estimate time to complete planned work. 1= No audit planning experience, 2= Usually overestimate, 3= Usually reasonably accurate, 4= Usually underestimate. None of the participants in the sample selected choice 1.

Risk Preference is a self-report by the participant of whether they tend to accept more or less risk than other auditors. 1= Much more willing to accept risk, 2= Somewhat more willing to accept risk, 3= About the same as most, 4= Somewhat less willing to accept risk, 5= Much less willing to accept risk.

Realism is the score assigned by the participant to answer the question, “How realistic did you find this experiment?” 1= Very Realistic, 2= Somewhat Realistic, 3= Somewhat Unrealistic, 4= Very Unrealistic.

Minutes to Complete is the self-reported time to complete the experiment.

*Sample size varies because some participants left this information blank.

Table 2
Extent of Substantive Testing: Cell Means (Standard Deviations)

		<u>Strong Tone-at-the-Top</u>		<u>Weak Tone-at-the-Top</u>	
		Results of Control Testing		Results of Control Testing	
		<u><i>Favorable</i></u>	<u><i>Unfavorable</i></u>	<u><i>Favorable</i></u>	<u><i>Unfavorable</i></u>
<i>Volatile Business Environment (n=19)</i>	<i>Favorable Analytic Procedures</i>	3.05 (1.09)	4.87 (1.07)	5.53 (0.96)	6.45 (0.98)
	<i>Unfavorable Analytic Procedures</i>	4.53 (1.11)	5.68 (0.77)	6.00 (1.07)	7.21 (0.84)
<i>Stable Business Environment (n=18)</i>	<i>Favorable Analytic Procedures</i>	3.03 (1.41)	5.00 (1.25)	5.22 (1.25)	6.36 (1.00)
	<i>Unfavorable Analytic Procedures</i>	4.55 (1.17)	5.44 (1.01)	6.33 (0.87)	7.06 (0.84)

Note: Auditors responded on a nine-point Likert scale anchored at “No Testing” (1) and “Extensive Testing” (9).

Table 3
Analyses of Variance for Extent of Substantive Testing

Tests of Between-Subjects Effects

	Degrees of Freedom	F-Test	Significance
Intercept	1	2491.00	.000
Business Stability (BS)	1	.03	.856
Error	35		

Tests of Within-Subjects Effects

	F-Test	Significance (two-tailed)
Main Effects	130.31	.000
Tone-at-the-Top (Tone)		
Results of Control Tests (Control)	97.37	.000
Planning Phase Analytic Procedures (PPAP)	63.84	.000
Two-way Interactions		
Tone*BS	.01	.930
Tone*Control	9.54	.004
Tone*PPAP	3.91	.056
Control*BS	.15	.703
Control *PPAP	9.30	.004
PPAP*BS	.08	.785
Three-way Interactions		
Tone*BS*Control	.07	.793
Tone*BS*PPAP	2.06	.160
Tone*Control*PPAP	9.12	.005
Control*BS*PPAP	3.41	.073
Four-way Interactions		
Tone*BS*Control*PPAP	0.28	.603

Appendix B

Figure 1
Decomposition of Three-way Interaction
for Extent-of-Substantive-Testing Judgments
Holding Tone-at-the-Top Constant

Panel A: Unfavorable Tone-at-the-Top

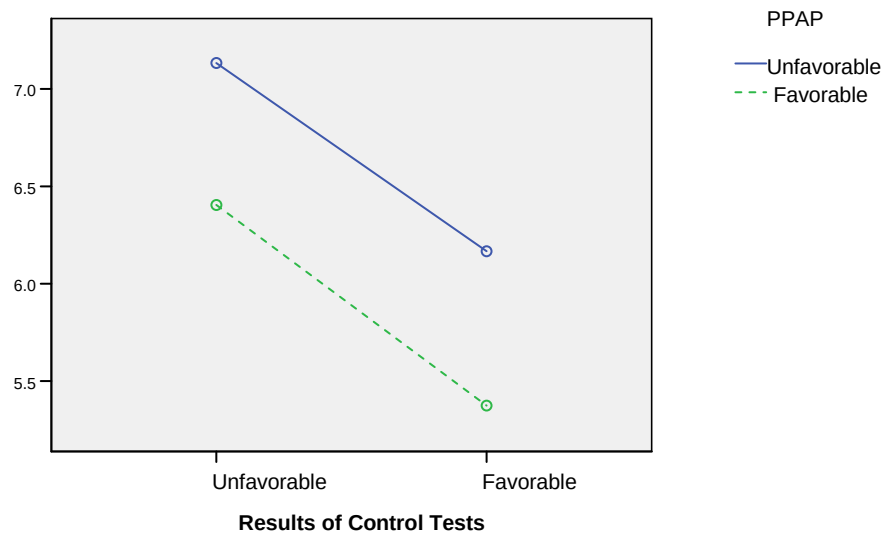


Figure 1
Decomposition of Three-way Interaction
for Extent-of-Substantive-Testing Judgments
Holding Tone-at-the-Top Constant

Panel B: Favorable Tone-at-the-Top

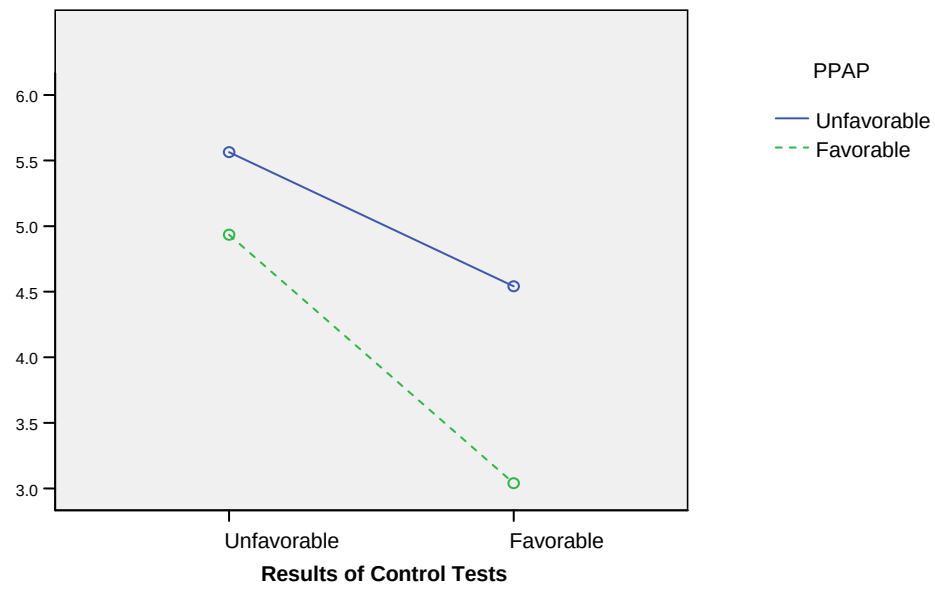


Figure 2
Decomposition of Three-way Interaction
for Extent-of-Substantive-Testing Judgments
Holding Results of Control Tests Constant

Panel A: Unfavorable Results of Control Tests

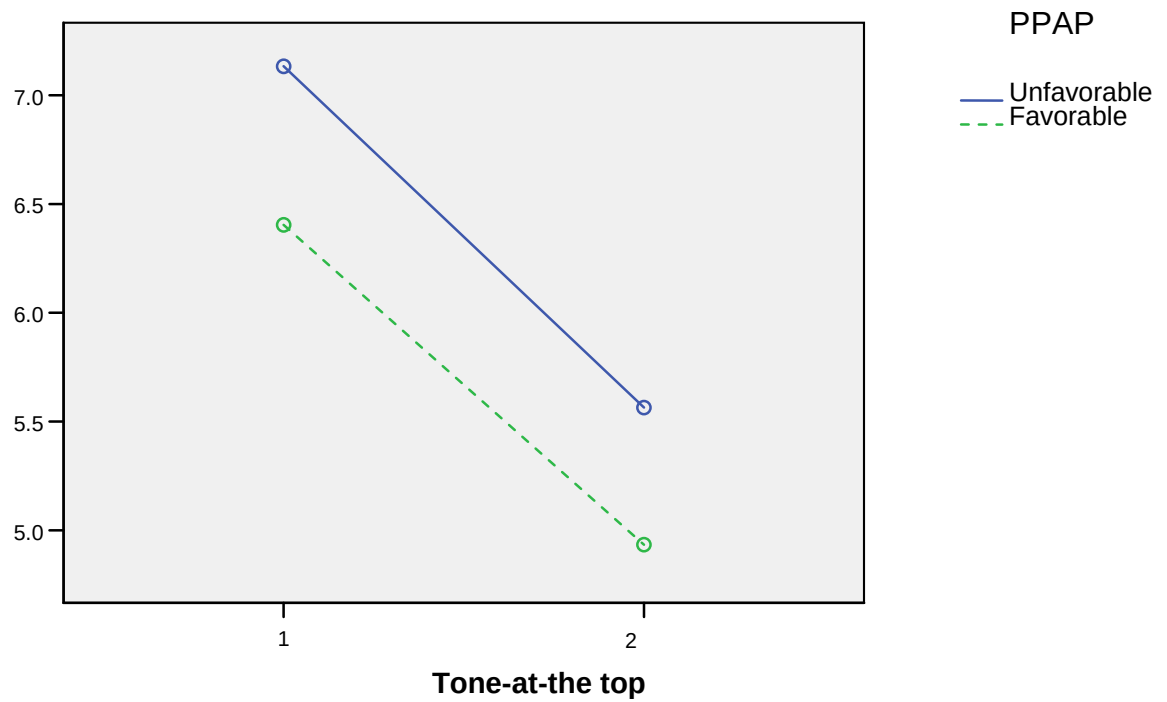
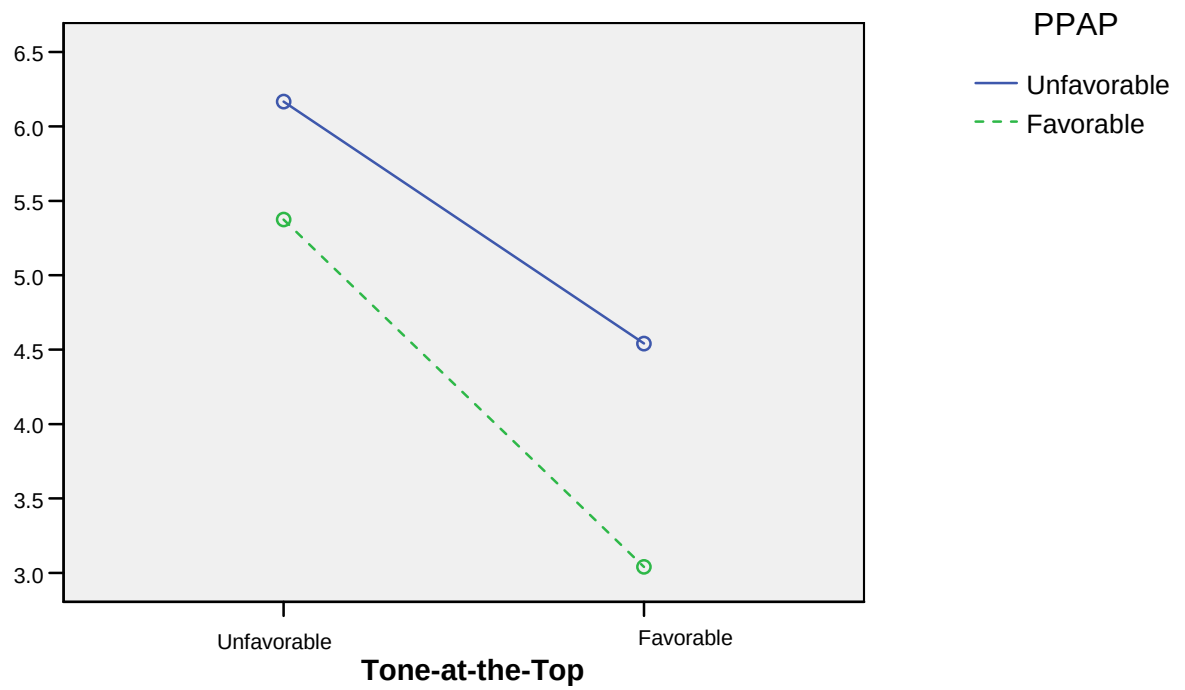


Figure 2
Decomposition of Three-way Interaction
for Extent-of-Substantive-Testing Judgments
Holding Results of Control Tests Constant

Panel B: Favorable Results of Control Tests



Endnotes

ⁱ Booklet three also contained several cases involving evaluations of internal control effectiveness. These cases were used to investigate a separate research issue and were not analyzed in the current study.

ⁱⁱ A mixed factorial design was used for purposes of power and efficiency. Complete between-subjects designs often have the undesirable characteristic of a relatively large error term and require a greater number of participants than mixed or within-subjects designs. A complete within-subjects design was not used in order to keep the number of cases that each participant was asked to evaluate down to a reasonable level. While demand effects can jeopardize the interpretability of results in studies employing a within-subjects design due to the possibility of participants anticipating the researcher's predictions, in this study, the possibility of demand effects is minimized by the focus on interactive, rather than main, effects. Participants are much less likely to anticipate specific predictions involving interactive effects between factors than predictions involving main effects.

ⁱⁱⁱ Two additional cases were included in booklet two. These additional cases were similar to, but shorter than, the cases analyzed in this study, and were used to investigate a separate research issue. This raised the total number of audit planning cases to 10. Although not their primary purpose, these additional cases served to further reduce the possibility of demand effects.

^{iv} Business stability may not have had much influence on participants' perceptions of the risk of material misstatement of receivables, since receivables are generally considered to be a "high risk" account. This is one possible explanation for the lack of results for this factor (i.e. receivables were seen as equally high in risk regardless of business stability).

^v We also ran our results using results collected for budgeted hours. The results are substantially the same; therefore those results are not tabulated.

^{vi} We included experience as a covariate and found that it was not significant; therefore, we do not include it in the tabulated results. Inclusion does not change the inferences of our results.