THE MITIGATING EFFECT OF INTERNAL CONTROL EFFECTIVENESS ON THE RELATIONSHIP BETWEEN SOURCE OBJECTIVITY, EVIDENCE SET SIZE, AND EVIDENCE PERSUASIVENESS

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ABSTRACT

Evidence persuasiveness, the degree to which the auditor is convinced that the evidence supports the audit opinion, is particularly important when evaluating accounting estimates. This study examines how variation in selected evidence characteristics due to recent industry trends (i.e. the demand for more timely reporting and the movement toward continuous auditing) may impact audit evidence persuasiveness. It hypothesizes that decreases in the evidence competence characteristic of source objectivity and in the evidence sufficiency characteristic of evidence set size will lower evidence persuasiveness. A control mechanism, the evidence competence characteristic of internal control effectiveness, is predicted to mitigate the above evidence limitations. These hypotheses are tested using controlled experimental methods.

Results indicate that internal control effectiveness partially mitigates the impact on evidence persuasiveness of using internal rather than external evidence for allowance for doubtful accounts and provision for product warranty claims tasks.

Key Words: Evidence evaluation, Source objectivity, Internal control effectiveness, Subsequent event evidence, Timely reporting, Continuous auditing.

Data Availability: Please contact the author.

I. INTRODUCTION

Evidence persuasiveness, the degree to which the auditor is convinced that the evidence supports the audit opinion, is particularly important when evaluating accounting estimates (Ramos 1998, Arens and Loebbecke 2000). Traditionally, auditors have viewed evidence obtained from external parties and/or subsequent events as more persuasive than internal/historical evidence. However, recent industry trends (e.g. the demand for more timely reporting and the movement toward continuous auditing[1]) suggest that auditors may be forced to rely on less persuasive internal and/or historical[2] evidence (Stein and Rittenberg 1995, Elliott 1997, CICA 1999, Wallman 1997, AICPA 1997a, AICPA 1999, Kogan et al. 1999, Public Oversight Board Panel on Audit Effectiveness 2000, FASB 2000, 2001).

Few prior studies explore whether control mechanisms compensate for evidence limitations[3] (Beaulieu and Rosman 1999, Bonner 1999). This study hypothesizes that the evidence competence characteristic of internal control effectiveness may mitigate the negative impact of current industry trends when evaluating the persuasiveness of

[1] The joint American Institute of Certified Public Accountants (AICPA) and Canadian Institute of Chartered Accountants (CICA) research study defines continuous auditing as a 'methodology that enables independent auditors to provide written assurance on a subject matter using a series of auditors' reports issued simultaneously with, or a short period of time after, the occurrence of events underlying the subject matter' (CICA 1999, 5).

[2] *Historical evidence* refers to evidence about events that occurred before or at period-end.

[3] *Evidence limitations* refers to lower evidence persuasiveness due to (1) the use of internal evidence rather than more competent external evidence, and (2) the use of historical evidence (i.e. evidence set size equals one) rather than more sufficient historical and subsequent event evidence (i.e. evidence set size equals two).

evidence supporting accounting estimates. This research uses a traditional audit setting and controlled experimental methods. Auditor subjects evaluated the likelihood that specific financial statement accounts are not materially misstated. Source objectivity (internal vs. external), evidence set size (historical vs. historical and subsequent event), and internal control effectiveness (strong vs. weak) characteristics were manipulated.

Results indicate that internal control effectiveness partially mitigates the impact on evidence persuasiveness of using internal rather than external evidence for allowance for doubtful accounts and provision for product warranty claims tasks.

This research has important implications for both academicians and practitioners. Few prior studies examine whether control mechanisms compensate for evidence limitations (Beaulieu and Rosman 1999, Bonner 1999). This study expands on limited work exploring how evidence characteristics interact by examining interactions between (1) source objectivity and internal control effectiveness, and (2) evidence set size and internal control effectiveness. Estimation accuracy (or lack thereof) has recently received significant attention from regulators and standard setters (Wallman 1997, Levitt 1998, Ramos 1998, AICPA 1999, Kinney 2001). This study extends prior estimation research by examining the impact of changes in selected evidence characteristics on the estimation process for allowance for doubtful accounts and provision for product warranty claims tasks.

From a practitioner's perspective, this research suggests that the negative impact on evidence due to recent industry trends may be reduced when internal control effectiveness is considered. Thus, one hurdle to reducing audit report lag and to

effectively and efficiently implementing continuous auditing may be significantly diminished.

The paper proceeds as follows. Section II presents a model of the judgment formation process, and proposes hypotheses to examine how evidence limitations and the interaction between evidence limitations and internal control effectiveness may impact auditor judgment. Section III describes the experimental design. Section IV summarizes the experimental results. Section V concludes the paper by discussing theoretical implications and issues for future research.

II. BACKGROUND AND HYPOTHESES DEVELOPMENT

Many judgments require auditors to evaluate the persuasiveness of hard accounting evidence, i.e. evidence based on past events (Ramos 1998, 31). However, accounting estimates require auditors to consider the persuasiveness of qualitatively different soft evidence since estimates depend on future events and the intended actions of management (Ramos 1998, AIPCA 2001a, 342.04). The judgment formation process model developed by Mautz and Sharaf (1961) illustrates how auditors may evaluate the persuasiveness of soft evidence.

The judgment formation process includes five steps (Mautz and Sharaf 1961, 103). First, the proposition to be proved is identified. Second, the proposition is evaluated to determine if it requires evidence of a high or moderate degree of probability.[4] Third, individual evidence items are collected within the given limits of

[4] For example, Phillips (1999) finds that a proposition relating to a high risk account would require evidence of a higher degree of probability than a proposition relating to a low risk account.

time and cost. Fourth, evaluation of evidence as valid or not valid occurs. Finally, proposition judgment is made.

This paper concentrates on the evidence evaluation process. Evidence evaluation involves 'diagnostic inference processes that are often complex and hierarchical in nature' (Holstrum and Mock 1985, 105). Causal inference modeling and discussions with practitioners suggest that evidence evaluation may consist of three parts. First, the auditor assesses how each competence characteristic [5] of an individual evidence item impacts his/her evaluation of the item's persuasiveness. To illustrate, assume the proposition of interest is the assertion that the allowance for doubtful accounts is fairly stated (i.e. not materially misstated). The auditor may view an evidence item about a potential uncollectible account as less persuasive if the item was obtained from client management rather than an independent credit agency. This illustrates how a change in the competence characteristic of source objectivity may impact evidence persuasiveness.

Second, the auditor integrates the various competence characteristics of an evidence item. [6] For example, if the evidence item obtained from client management was produced by effective internal controls, the auditor may revise higher his/her initial low persuasiveness evaluation. Thus, internal control effectiveness may (at least partially) mitigate the auditor's evidence persuasiveness concerns related to source objectivity.

[5] Arens and Loebbecke (2000) identify seven evidence competence characteristics: evidence relevance, internal control effectiveness, timeliness, verifiability, directness, source expertise, and source objectivity/independence.

[6] Moeckel defines integration as 'identification of the meaningful relationships that exist between separate characteristics of evidence' (1991, 271).

Third, the auditor determines if the existing evidence set (i.e. all evidence items evaluated to date) is sufficient to evaluate the proposition of interest.[7] If not, additional evidence items may be collected and evaluated. Since initial account balance judgment is generally formed by (or closely following) period-end (Koonce 1993), a subsequent event evidence item increases the evidence sufficiency characteristic of evidence set size. Figure 1 summarizes the judgment formation process.[8]

Impact of Evidence Limitations on Evidence Evaluation

The paper examines the impact of decreases in evidence characteristics due to recent industry trends on how auditors evaluate the persuasiveness of evidence supporting accounting estimates. As illustrated above, relying on internal rather than external evidence reduces the evidence competence characteristic of source objectivity, and relying on historical rather than historical and subsequent event evidence reduces the evidence sufficiency characteristic of evidence set size. Following the spirit of Bonner (1999), hypotheses examining how these evidence deficiencies impact evidence persuasiveness follow. Then, a control mechanism to remedy these deficiencies is proposed.

[7] Carter and Pincus (1996) propose that auditors consider the several characteristics when evaluating evidence sufficiency. These include: evidence set size, dispersion of estimates, evidence set composition, and deviations from expectations.

[8] The judgment formation process is iterative. For example, if either the competence of an individual characteristic is questionable or the evidence set is insufficient, additional evidence items may be collected. In addition, if the valid evidence items acquired disconfirm the proposition, the entire process may be repeated beginning with identifying a new proposition to prove. The iterative feature of the judgment formation process is illustrated in Figure 1 by a dotted line.

External vs. Internal Evidence

Standards indicate that auditors should assign greater persuasiveness to evidence from external parties than to evidence from internal parties (AICPA 2001a, AU 326.21). Prior research suggests that auditors generally follow audit standard guidelines related to source objectivity (Joyce and Biddle 1981 experiment 3b, Knechel and Messier 1990, Hirst 1994, Caster and Pincus 1996). However, source objectivity may be compromised if more timely reporting is demanded. Specifically, the auditor may be unable to use evidence from external parties if there are delays in obtaining responses to requests.[9] Thus, the auditor must rely on less persuasive internal evidence. The following hypothesis (stated in alternative form) predicts that prior results will be replicated and reflects the impact of the need to rely on internal rather than external evidence:

H1a: External historical evidence is more persuasive to auditors than internal historical evidence.

Figure 2 illustrates H1a as the external evidence line remains higher (i.e. is more persuasive) than the internal evidence line across both levels of internal control effectiveness.

Subsequent Event vs. Historical Evidence

Auditors may obtain persuasive evidence related to accounting estimates in a traditional audit by examining transactions incurred after the period-end date (AICPA 2001a, AU 342.13; CICA 2001, paragraph 5205.05). For example, an auditor may

[9] The joint AICPA/CICA study (CICA 1999) acknowledges that it may be possible to gather external evidence electronically from third parties with a well-established relationship to the client. However, if the client establishes a significant relationship with a new customer or supplier today, the auditor may not be able to implement secure electronic communication with this new external party before an audit opinion upon demand is requested.

examine January collection activity to ensure that the allowance for doubtful accounts estimate at December 31st is sufficient. Research examining how individuals evaluate subsequent event evidence is sparse (Bruynes 1988). Subsequent event evidence reduces the auditor's uncertainty about the fairness of the recorded period-end account balances (AICPA 2001a, AU 560.03). However, the demand for more timely reporting and the movement toward continuous auditing decrease (if not eliminate completely) the time between period-end date and report issuance date. Thus, the auditor must rely on historical evidence (CICA 1999).

The difference between subsequent event and historical evidence may impact the evidence sufficiency characteristic of evidence set size since subsequent event evidence provides an additional message (i.e. message content changes) that the auditor did not know of at period-end. Auditors will generally view a larger evidence set size as more sufficient (and thus more persuasive) provided the additional evidence does not contradict prior beliefs. The impact on auditor judgment of relying on historical rather than historical and subsequent event evidence is summarized as (stated in alternative form): [10]

H1b: Internal subsequent event evidence is more persuasive to auditors than internal historical evidence.

H1b is illustrated in Figure 2 since the subsequent event evidence line remains higher (i.e. is more persuasive) than the historical evidence line across both levels of internal control effectiveness.

[10] This exploratory hypothesis is motivated by auditing standards and intuition as there is little empirical work comparing the persuasiveness of historical and subsequent event evidence.

Impact of Internal Control Effectiveness on Evidence Limitations

Recent industry trends have increased the importance of internal control cues in evidence evaluation (Sundem et al. 1996, Wallman 1997, Elliott 1997, AICPA 1997b, 2001b, Bell et al. 1997, KPMG 1999, Rezaee et al .2000, Public Oversight Board Panel on Audit Effectiveness 2000, O'Donnell et al. 2000). In addition, the Statement on Auditing Standards No. 94 (AICPA 2001b; hereafter SAS No. 94), suggests there are circumstances where it is not practical or possible to restrict detection risk to an acceptable level without performing tests of controls. Evidence competence increases as internal control effectiveness improves. Prior research indicates that auditors adjust their judgments appropriately as internal control effectiveness varies (Cohen and Kida 1989, Maletta and Kida 1994, Asare and Davidson 1995, Marden, Holmstrum, and Schneider 1997).

Furthermore, effective internal controls result in a lower assessment of control risk. The audit risk model framework (planned detection risk = acceptable audit risk / (inherent risk $*$ control risk)) suggests that lower control risk increases planned detection risk (AICPA 2001a, AU 312; AICPA 2001a, AU 350). Planned detection risk is used to determine the nature, timing and extent of audit evidence. Thus, effective internal controls may impact the nature, timing and/or extent of audit evidence. As described below, this study examines how internal control effectiveness influences the nature of audit evidence.

Relationship between Evidence Limitations and Internal Control Effectiveness

Auditing standards indicate that source objectivity and internal control effectiveness are not mutually exclusive factors (i.e. they may interact) (AICPA 2001a, AU 326.21). Specifically, the standard suggests that effective internal controls provide

greater assurance to auditors about the reliability of internal evidence (AICPA 2001a, AU 326.21b). The standards are silent, however, on how (or whether) internal control effectiveness affects the persuasiveness of external evidence. Intuitively, since external evidence is not generated within the client's internal control system, the persuasiveness of external evidence should be independent of internal control effectiveness. Thus, I propose that internal control effectiveness may mitigate evidence limitations requiring the use of internal rather than external evidence. The predicted interaction between source objectivity and internal control effectiveness can be summarized as:

> H2a: The difference in evidence persuasiveness between weak and strong internal controls will be greater for internal historical evidence than for external historical evidence.

H2a is illustrated in Figure 2 since the slope of the internal evidence line is greater than the slope of the external evidence line.

In addition to the inability to obtain external evidence, recent industry trends indicate that a second evidence limitation, the inability to access subsequent event evidence may exist. The standards are silent on how using historical rather than both historical and subsequent event evidence will interact with internal control effectiveness. If the subsequent event evidence comes from an external source, H2a applies. For internal subsequent event evidence, I propose a similar (although potentially smaller)[11]

[11] I hypothesize that this interaction may be smaller based on discussions with practitioners and persuasion theory. Practitioners suggested that auditors generally rely on subsequent event evidence only if historical evidence indicates that the year-end balance may be misstated. Persuasion theory predicts that decision makers are more likely to rely on simple cues such as individual evidence competence characteristics when the evidence requires little information processing (i.e. peripheral processing) than when the evidence requires significant information processing (i.e. cognitive elaboration) (Petty and Cacioppo 1981, 1984, 1986, Perloff 1993, Chaiken and Maheswaran 1994). Prior research suggests that auditors may follow a peripheral processing route when considering internal or external evidence (Anderson, Koonce, Marchant 1995, Reimers and Fennema 1999, Goodwin 1999). In contrast, practitioners indicate that cognitive elaboration is required to evaluate subsequent event evidence. Thus,

interaction since the inability to use subsequent event evidence is another surrogate for the theoretical construct of insufficient evidence. The predicted interaction between internal subsequent event evidence and internal control effectiveness can be summarized as:[12]

> H2b: The difference in evidence persuasiveness between weak and strong internal controls will be greater for internal historical evidence than for internal subsequent event evidence.

Figure 2 illustrates H2a since the slope of the historical evidence line is greater than the slope of the subsequent event evidence line.

Summary of Hypotheses

Hypotheses were developed to examine (1) how the inability to use external and/or subsequent event evidence may impact evidence persuasiveness, and (2) whether internal control effectiveness may mitigate these evidence limitations. The experimental hypotheses are summarized in Figure 3. Section III describes a controlled experiment conducted to test these hypotheses.

III. EXPERIMENTAL DESIGN

Overview and Experimental Materials

A within subject design was used. Two tasks were used to increase generalizability. Following auditing standards, recent research, and business press attention, these tasks involved asset and liability accounts that require significant

auditors are more likely to consider differences in source objectivity than differences in the use of historical vs. subsequent event evidence when internal control effectiveness varies since the later requires more cognitive elaboration.

[12] This exploratory hypothesis assumes H1b is true. Similar to H1b, it is motivated by auditing standards and intuition as there is little empirical work examining the relationship between internal control effectiveness and subsequent event evidence.

estimation judgment (AICPA 2001a, AU 560.11; Beasley, Carcello, and Hermanson 1999, Quintanilla 1998, Schmitt 1998, Ramos 1998). The allowance for doubtful accounts task was examined in prior source objectivity research (see Joyce and Biddle 1981, Bamber 1983, Hirst 1994, Caster and Pincus 1996 and Reimers and Fennema 1999) and addresses the existence assertion. The provision for product warranty claims task addresses the completeness assertion. This task was designed based upon interviews with auditors from the participating firm and accounting managers from two multinational firms with significant product warranty claims liabilities.

Subjects first reviewed common background information for the task and then examined individual treatment scenarios.[13] For each scenario, subjects assessed the probability that the account is correctly stated (i.e. not materially misstated). For the allowance for doubtful accounts task, subjects also estimated the percentage of the overdue account to include in the allowance for doubtful accounts.

All treatment stimuli, except for the evidence set size stimuli in the provision for product warranty claims task[14], were designed so that the more persuasive evidence (as indicated by the high level of each independent variable) increased the likelihood that the account was correctly stated (i.e. not materially misstated). The order of the treatments was randomly varied between subjects to control for order effects.

[13] Experimental materials were designed to reflect general audit procedures as opposed to specific procedures such as inspection or recalculation. This reduces the concern that the scenarios test differences in audit procedures rather than differences in evidence characteristics.

[14] The more persuasive evidence set size manipulation for the provision for product warranty claims task (i.e. evidence set size equals two) decreases the likelihood that the account was correctly stated (i.e. not materially misstated).

A traditional auditing setting was used. All materials were pre-tested on graduate business students with significant prior auditing experience and on auditors from the firm providing subjects to ensure better construct validity.[15]

Subjects

Subjects were 24 auditors from one national accounting firm.[16] Subjects averaged 10.6 years of auditing experience. Discussions with representatives from the firm indicated a minimum of three years of experience was appropriate for the experimental task. The task assumes control risk is assessed to be less than maximum. Data from the post-questionnaire shows all but one participant have assessed control risk to be less than maximum for at least one audit.[17] Thus, the subjects have previously considered internal control effectiveness as a factor when evaluating evidence in practice.

Independent Variables

Source objectivity was manipulated at two levels: (1) presence of external historical evidence, and (2) presence of internal historical evidence. Evidence set size was also manipulated at two levels: (1) presence of both internal historical and subsequent event evidence (i.e. evidence set size equals two) and (2) presence of only internal historical evidence (evidence set size equals one). Internal control effectiveness was varied at two levels: strong and weak.

[15] Pilot test participants averaged 4.5 years of audit experience.

[16] The experimental instrument was distributed by a firm audit partner and returned directly to the researcher. The response rate was approximately 30%.

[17] Excluding this subject from the analysis, the conclusions remain unchanged.

Figures 4 and 5 illustrate the source objectivity, evidence set size, and internal control effectiveness manipulations used in this study. Two 2 x 2 factorial designs were used. The 2 x 2 design to address H1a and H2a uses internal historical evidence and external historical evidence as source objectivity manipulations. The 2 x 2 design to address H1b and H2b uses internal historical evidence (i.e. evidence set size equals one) and both internal historical and internal subsequent event evidence (i.e. evidence set size equals two) as evidence set size manipulations.

Dependent Variables

Two surrogates were used for evidence persuasiveness for the allowance for doubtful accounts task. First, subjects assessed the likelihood that the account is materially correct (i.e. not materially misstated). Second, subjects estimated the percent of the material overdue account that should be included in the allowance for doubtful accounts balance. The second allowance for doubtful accounts dependent variable was used to increase construct validity (Campbell and Fiske 1959) and to enhance comparability with prior source objectivity research (Joyce and Biddle 1981, Hirst 1994, and Reimers and Fennema 1999). One surrogate for evidence persuasiveness was used for the provision for product warranty claims task: the likelihood that the account is materially correct (i.e. not materially misstated). Since the underlying theoretical construct of interest, evidence persuasiveness, is unobservable, the measured dependent variables represent observable outcomes of the judgment formation process.

The experimental design is summarized in Figures 6 and 7 for the allowance for doubtful accounts and provision for product warranty claims tasks respectively.

Manipulation Checks

To determine whether subjects' perceptions of evidence characteristics agreed with those of the experimenter, subjects evaluated the competence or sufficiency of each evidence stimuli in the post experiment questionnaire. Results are shown in Table 1. Panel A indicates that subjects assigned higher competence ratings to external historical evidence stimuli than to internal historical evidence stimuli for the allowance for doubtful accounts task ($t = 11.99$, $p < 0.0001$). The subsequent event stimuli manipulation for the allowance for doubtful accounts tasks was also effective. Manipulation check results indicate that auditors assign higher sufficiency ratings to the internal subsequent event stimuli rather than to the internal historical evidence ($t = 6.80$, $p < 0.0001$). Finally, the internal control effectiveness manipulation check for the allowance for doubtful accounts task finds that subjects assigned significantly higher competence ratings to the strong internal control scenario than to weak internal control scenario ($t = 17.13$, $p < 0.0001$).

Panel B of Table 1 shows that similar results were found for the provision for product warranty claims task. Specifically, auditors assigned higher competence ratings to external historical evidence stimuli than to internal historical evidence ($t = 13.91$, $p < 0.0001$). Similarly, subjects rated the sufficiency of subsequent event evidence as higher than that of historical evidence ($t = 6.20$, $p < 0.0001$). Finally, the internal control effectiveness manipulation was effective ($t = 14.26$, $p < 0.0001$).

IV. EXPERIMENTAL RESULTS

Tests of Hypotheses for Allowance for Doubtful Accounts Task

H1a seeks to replicate prior research. H1b is an exploratory hypothesis. H2a and H2b examine the proposed interaction between evidence limitations and internal

control effectiveness. To analyze the experimental results, ANOVAs were run for each dependent variable. Hypothesis 1a (1b) would be supported by a significant source objectivity (evidence set size) main effect where the mean is greater for the external (subsequent event) evidence condition than the internal (historical) evidence condition. Hypothesis 2a (2b) would be supported by a significant interaction between source objectivity (evidence set size) and internal control effectiveness where the difference in persuasiveness between internal (historical) and external (subsequent event) evidence is greater for weak internal controls than for strong internal controls.

Tests of H1a - Persuasiveness of External vs. Internal Evidence

Results for the allowance for doubtful accounts task for H1a for the likelihood dependent variable are shown in Table 2. External evidence appears to be more persuasive to subjects than internal evidence ($t = 5.56$, $p < 0.0001$).[18] Thus, H1a is supported.

Results for the allowance for doubtful accounts task for H1a for the percent dependent variable are shown in Table 3.[19] Similarly, external evidence is more persuasive than internal evidence ($t = 4.06$, $p = 0.0003$). This supports H1a and prior research (i.e. Joyce and Biddle 1981, Hirst 1994, and Reimers and Fennema 1999).

Tests of H1b - Persuasiveness of Subsequent Event vs. Historical Evidence

Table 4 presents results for the allowance for doubtful accounts task for H1b for the likelihood dependent variable. No significant difference in persuasiveness between historical and subsequent event evidence was observed as H1b is not supported ($t = 0.10$, $p = 0.4663$).

[18] For directional hypotheses, t values, rather than F values, are reported.

Table 5 presents results for the allowance for doubtful accounts task for H1b for the percent dependent variable. Similarly to the likelihood dependent variable results, no significant difference in persuasiveness between historical and subsequent event evidence was observed ($t = 0.55$, $p = 0.2980$). Thus H1b is not supported.

Tests of H2a – Interaction of Source Objectivity and Internal Control Effectiveness

Table 2 shows the source objectivity by internal control effectiveness interaction, graphed in Panel C, is statistically significant for the likelihood dependent variable ($t = 2.29$, $p = 0.0158$). As hypothesized, subjects appear to place greater emphasis on internal control effectiveness differences when evaluating internal rather than external evidence. Thus, H2a is supported. The means shown in Panel B indicate that the effect of source objectivity is different across the two levels of internal control effectiveness. The hypothetical development for H2a implies that internal evidence generated by strong internal controls will be more persuasive to auditors than internal evidence generated by weak internal controls. A contrast test evaluating the simple effects of internal control effectiveness on internal evidence indicates that internal evidence generated by strong internal controls is more persuasive to subjects than internal evidence generated by weak internal controls ($t = 15.73$, $p < 0.0001$).

The hypothetical development for H2a also implies that external evidence generated by strong internal controls will be equally persuasive to auditors as external evidence generated by weak internal controls. Results of a contrast test comparing the persuasiveness of external evidence/strong controls to external evidence/weak controls indicate there is a statistically significant difference in persuasiveness of external

[19] The two dependent variables are highly correlated ($r = - 0.5578$, $p = 0.0393$).

evidence across levels of internal control effectiveness ($t = 12.49$, $p < 0.0001$). Thus, source objectivity and internal control effectiveness are not independent.

Finally, whether internal control effectiveness completely compensates for source objectivity concerns is examined. Results of a contrast test comparing the persuasiveness of internal evidence/strong controls to external evidence/strong controls suggests that internal control effectiveness does not completely mitigate source objectivity concerns ($t = 4.63$, $p = 0.0001$).

Table 3 indicates the source objectivity by internal control effectiveness interaction for the percent dependent variable is statistically significant ($t = 2.57$, $p = 0.0088$).[20] As shown in Panel C of Table 3, subjects appear to place greater emphasis on internal control effectiveness differences when evaluating internal rather than external evidence. Thus, H2a is supported. The hypothetical development for H2a implies that internal evidence generated by strong internal controls will be more persuasive to auditors than internal evidence generated by weak internal controls. A contrast test evaluating the simple effects of internal control effectiveness on internal evidence was conducted. Results indicate that internal evidence generated by strong internal controls is more persuasive to subjects than internal evidence generated by weak internal controls ($t = 5.29$, $p < 0.0001$).

The hypothetical development for H2a also implies that external evidence generated by strong internal controls will be equally persuasive to auditors as external evidence generated by weak internal controls. A contrast test comparing the

persuasiveness of external evidence/strong controls with external evidence/weak controls finds no statistically significant difference in persuasiveness (t=1.35, p=0.1911).

Finally, the issue of whether internal control effectiveness completely compensates for source objectivity concerns is of practical interest. A contrast test comparing the persuasiveness of internal evidence/strong controls with external evidence/strong controls suggests that internal control effectiveness may completely mitigate the need to use internal rather than external evidence (t = 1.64, p = 0.1149).

Tests of H2b – Interaction of Evidence Set Size and Internal Control Effectiveness

Table 4 indicates the evidence set size by internal control effectiveness interaction for the likelihood dependent variable is significant (t = 1.94, p = 0.0324). As shown in Panel C of Table 4, the results partially support H2b. As hypothesized, subjects appear to place greater emphasis on differences in internal control effectiveness when evaluating historical rather than historical and subsequent event evidence. This can be seen graphically by comparing the slopes of the historical vs. subsequent event evidence lines in Panel C. However, H2b predicts that subsequent event evidence will be more persuasive than historical evidence alone when internal control effectiveness is weak. A contrast test indicates there is no significant difference in persuasiveness between these two conditions (t = 1.44, p = 0.1623).

[20] As noted earlier, the percent dependent variable is predicted to be higher for scenarios with lower evidence persuasiveness, thus interaction illustrated in Panel C of Table 3 should be compared to the hypothesized interaction shown in Panel B of Figure 6.

Table 5 shows the evidence set size by internal control effectiveness interaction for the percent dependent variable, graphed in Panel C of Table 5, is significant (t = 2.11, p = 0.0234) and in the correct direction to support H2b.[21]

Summary of Results for Allowance for Doubtful Accounts Task

Results from the allowance for doubtful accounts task show subjects assign greater persuasiveness to external rather than internal evidence (i.e. H1a is supported). In addition, internal control effectiveness appears to partially mitigate evidence limitations requiring the use of internal rather than external evidence (i.e. H2a is supported). These results hold for both dependent variables.[22] However, results examining the persuasiveness of historical vs. subsequent event evidence are more difficult to summarize. H1b was not supported as subjects appear to assign similar persuasiveness to historical and subsequent event evidence. An interaction between evidence set size and internal control effectiveness apparently exists; however this interaction does not completely reflect the relationship predicted by H2b.

Tests of Hypotheses for Provision for Product Warranty Claims Task

The provision for product warranty claims task was designed to test the generalizability of the finding that internal control effectiveness may mitigate the impact of evidence limitations. Two major differences exist between the two tasks: (1) the

[21] Although Panel C of Table 5 also shows a disordinal interaction, a contrast test indicates that the difference in means between historical evidence / strong controls and subsequent event evidence / strong controls is not statistically significant (t = 0.86, p = 0.3984).

[22] Despite random sampling, the source objectivity vs. internal control effectiveness interaction could vary depending upon several alternative explanations. Subjects completed a post-experiment questionnaire to examine whether the research results could be explained by differences in (1) subjects' knowledge of continuous auditing concepts, (2) subjects' experience performing continuous auditing tasks, (3) subjects' pressure to adopt continuous auditing, (4) subjects' knowledge of SAS 80 concepts, or (5) subjects' experience level. To explore this possibility, ANOVAs were run adding each alternative explanation independently into the original model. No statistically significant results were found.

provision for product warranty claims task involves the completeness assertion rather than the existence assertion, and (2) the subsequent event evidence in the provision for product warranty claims task is negative (i.e. it presents evidence indicating that the account may be materially misstated). Results for this task are discussed below.

Tests of H1a - Persuasiveness of External vs. Internal Evidence

Table 6 presents the provision for product warranty claims task results for H1a for the likelihood dependent variable. H1a is supported as external evidence is more persuasive than internal evidence ($t = 4.77$, $p < 0.0001$).

Tests of H1b - Persuasiveness of Subsequent Event vs. Historical Evidence

Table 7 summarizes the provision for product warranty claims task results for H1b for the likelihood dependent variable. The difference between internal and subsequent event evidence is statistically significant ($t = 8.39$, $p < 0.0001$), and in the correct direction since the second evidence item is negative (i.e. this item indicates that the account may be misstated). Thus H1b is supported.

Tests of H2a – Interaction of Source Objectivity and Internal Control Effectiveness

The source objectivity by internal control effectiveness interaction is statistically significant as shown in Panels A and C of Table 6 ($t = 2.63$, $p = 0.0074$). Means shown in Panel B of Table 6 indicate that the effect of source objectivity is different across the two levels of internal control effectiveness. The theoretical development for H2a implies that internal evidence generated by strong internal controls is more persuasive than internal evidence generated by weak internal controls. A contrast test evaluating the simple effects of internal control effectiveness on internal evidence supports this prediction ($t = 12.11$, $p < 0.0001$).

H2a also suggests that the persuasiveness of external evidence/weak controls and external evidence/strong controls will be equal. Results of a contrast test indicate that internal control effectiveness does not completely mitigate source objectivity concerns since there is a statistically significant difference in persuasiveness of external evidence across levels of internal control effectiveness ($t = 8.38$, $p < 0.0001$).

Finally, the independence of internal control effectiveness and external evidence is explored. A contrast test comparing the persuasiveness of external evidence/weak controls with external evidence/strong controls suggests that the two constructs are not independent ($t = 2.79$, $p = 0.0103$).

Tests of H2b – Interaction of Evidence Set Size and Internal Control Effectiveness

The evidence set size by internal control effectiveness interaction, shown in Panels A and C of Table 7, is significant ($t = 5.69$, $p < 0.0001$). Since the experimental materials were designed so that the high evidence set size reduces the likelihood dependent variable, the graph shown in Panel C should be compared to Panel A of Figure 7 to evaluate this interaction. As predicted, the slope of the historical evidence line in Panel C is greater than the slope of the subsequent event evidence line. In addition, contrast tests indicate that historical evidence generated when internal control effectiveness is weak is less persuasive than historical evidence when internal control effectiveness is strong ($t = 9.51$, $p < 0.0001$); however the persuasiveness of subsequent event evidence does not vary as internal control effectiveness varies ($t = 1.46$, $p = 0.1571$). Thus, H2b is supported as subjects appear to place greater emphasis on differences in internal control effectiveness when evaluating historical rather than subsequent event evidence.

Summary of Results for Provision for Product Warranty Claims Task

Results from the provision for product warranty claims task show subjects assign greater persuasiveness to external rather than internal evidence (i.e. H1a is supported). In addition, internal control effectiveness appears to partially mitigate the impact on evidence persuasiveness of using internal rather than external evidence (i.e. H2a is supported).[23] In addition, H1b is supported as subjects assign greater persuasiveness to subsequent event rather than historical evidence. Finally, H2b is supported as subjects displayed greater variation in evidence persuasiveness between weak and strong internal controls for historical rather than subsequent event evidence.

V. DISCUSSION AND FUTURE RESEARCH DIRECTIONS

Auditors evaluate evidence throughout the audit process. An important goal of current audit research is to obtain an understanding of how auditors evaluate evidence (Weber 1999, 849). This study examines how auditors use source objectivity, evidence set size, and internal control effectiveness cues when evaluating the persuasiveness of evidence supporting accounting estimates. Results can be summarized as follows: (1) internal control effectiveness may partially mitigate the impact of evidence limitations that require auditors to use internal rather than external evidence, and (2) additional research is needed before determining if internal control effectiveness mitigates the impact of using historical rather than subsequent event evidence.

Research Implications

Evidence evaluation is impacted by variation in both evidence competence and evidence sufficiency characteristics. Prior evidence characteristic research has

[23] Despite random sampling, the source objectivity vs. internal control effectiveness interaction could vary depending upon several alternative explanations. To explore this possibility, ANOVAs were run

concentrated on exploring how variation in individual characteristics impacts accountant judgment. However, given that accountants often evaluate evidence items with multiple characteristics and that recent environmental changes will lower individual evidence competence and/or sufficiency characteristics, the issue of whether a weakness in one or more evidence characteristics can be (at least partially) mitigated by effectiveness in other characteristic is important. This study extends prior research by examining how one evidence competence characteristic, internal control effectiveness, may (at least partially) mitigate evidence limitations due to recent industry trends.

The accuracy of accounting estimates continues to draw regulator and standard setters' attention (Wallman 1997, Levitt 1998, Ramos 1998, AICPA 1999, Kinney 2001). Evaluating accounting estimates requires auditors to assess the persuasiveness of soft rather than hard evidence (Ramos 1998, 31). This study contributes to our knowledge of the accounting estimation process by examining how auditors assess the persuasiveness of soft evidence when evaluating the allowance for doubtful accounts and provision for product warranty claims accounts.

Implications for Demand for More Timely Reporting

Several researchers and practitioners argue that one reason why financial statements are losing value relevance is the delay between period-end and reporting date (Elliott 1997, FASB 2000, 2001). This paper indicates that as this delay becomes shorter (i.e. reporting timeliness is increased), internal control effectiveness may (at least partially) compensate for decreases in the evidence competence characteristic of source

adding each alternative explanation independently into the original model. No statistically significant results were found.

objectivity. Whether internal control effectiveness can compensate for decreases in the evidence sufficiency characteristic of evidence set size requires further study.

Implications for Continuous Auditing

The CICA/AICPA research study on continuous auditing (1999b) indicates that several questions must be addressed before continuous auditing can become a reality. One issue is to understand how evidence limitations will impact auditor judgment. This research finds that internal control effectiveness may partially mitigate limitations resulting from relying on internal rather than more competent external evidence. Thus, one hurdle to effectively and efficiently implementing continuous auditing may be significantly reduced.

Future Research Directions

Generalizability concerns may exist. For example, auditors must evaluate the competence and sufficiency of evidence related to accounting estimates throughout the audit process (e.g. before accepting a new client (Johnstone 2000), when making audit planning decisions (Bedard, Mock, and Wright 1999), and when evaluating account balances (Caster and Pincus 1996)). This study concentrates on evidence evaluation at the account level. Thus, the results can not be generalized to other audit tasks without further investigation.

The current study raises questions as to how auditors evaluate subsequent event evidence related to accounting estimates. Results suggest that a three-way interaction between evidence set size, evidence set composition, and internal control effectiveness may exist. Internal control effectiveness partially mitigates evidence limitations when subsequent event evidence was negative. However, the evidence set size vs. internal

control interaction was only marginally significant when the subsequent event evidence was positive. Future research in this direction may be beneficial.

In addition, given the increased importance of accounting estimates, additional work examining auditor estimation judgment is needed. Finally, the audit industry is experiencing rapid change. Providing insights into how these changes may impact auditor judgment is an important role for academic research.

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Table 1
Manipulation Checks

Panel A: Task 1 – Allowance for Doubtful Accounts Scenario

Treatment (n = 24)	*Mean*	*T-Statistic*	*p > T*
Source cbjectivity [a]			
Internal vs External	8.00	11.99	< 0.0001
Evidence set size[b]			
Historical vs. Historical and subsequent event	7.69	6.80	< 0.0001
Internal control effectiveness [c]			
Weak	2.17	17.13	< 0.0001
Strong	8.09		

Panel B: Task 2 – Provision for Product Warranty Claims

Treatment (n = 24)	*Mean*	*T-Statistic*	*p > T*
Source objectivity			
Internal vs External	8.13	13.91	< 0.0001
Evidence set size			
Historical vs. Historical and subsequent event	7.26	6.20	< 0.0001
Internal control effectiveness			
Weak	2.61	14.26	< 0.0001
Strong	7.65		

[a] Subjects rated which source they believed would provide more competent evidence on a scale of 1 (client management) to 10 (external party) with 5 serving as the neutral point of indifference. T-test compares subject rating to point of indifference.

[b] Subjects rated which source they believed would provide more sufficient evidence on a scale of 1 (historical only) to 10 (both historical and subsequent event evidence) with 5 serving as the neutral point of indifference. T-test compares subject rating to point of indifference.

[c] Subjects rated the internal control effectiveness of each scenario on a 0 (very weak) to 10 (very strong) scale. T-test compares subject ratings of weak internal control scenario to ratings of strong internal control scenario.

Table 2
Results: Analysis of Likelihood Allowance for Doubtful Accounts is Materially Correct – Source Objectivity

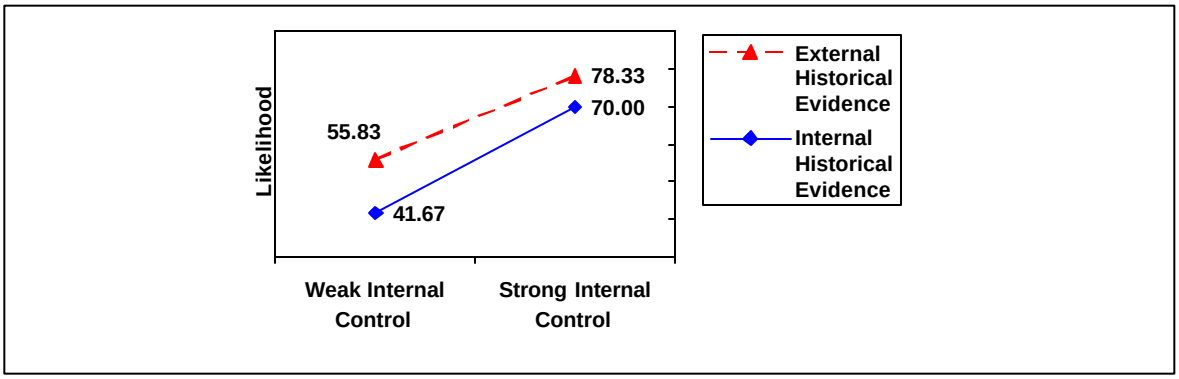
Panel A: Analysis of Variance with Likelihood Account is Materially Correct as the Dependent Variable

Treatment (n = 24)	*Type III SS*	*df*	*MS*	*F-Statistic*	*p > F*
Source objectivity	0.3038	1	0.3038	30.88[a]	< 0.0001
Internal control effectiveness	1.5504	1	1.5504	83.01[b]	< 0.0001
Source objectivity * Internal control effectiveness	0.0204	1	0.0204	5.24[c]	0.0316

Panel B: Means of Likelihood Account is Materially Correct (Standard Deviations)

	Internal Control Effectiveness		
Source Objectivity (n = 24)	*Weak*	*Strong*	*Overall*
Internal historical evidence	41.67 % (18.57)	70.00 % (13.51)	55.83 % (21.52)
External historical evidence	55.83 % (21.65)	78.33 % (14.35)	67.08 % (21.43)
Overall	48.75 % (21.20)	74.17 % (14.41)	

Panel C: Graph of Interaction



[a] Using Type III mean square for source objectivity * subject as an error term.

[b] Using Type III mean square for internal control effectiveness * subject as an error term.

[c] Using Type III mean square for internal control effectiveness * source objectivity * subject as an error term

Table 3
Results: Analysis of Percentage to Include in Allowance for Doubtful Accounts – Source Objectivity

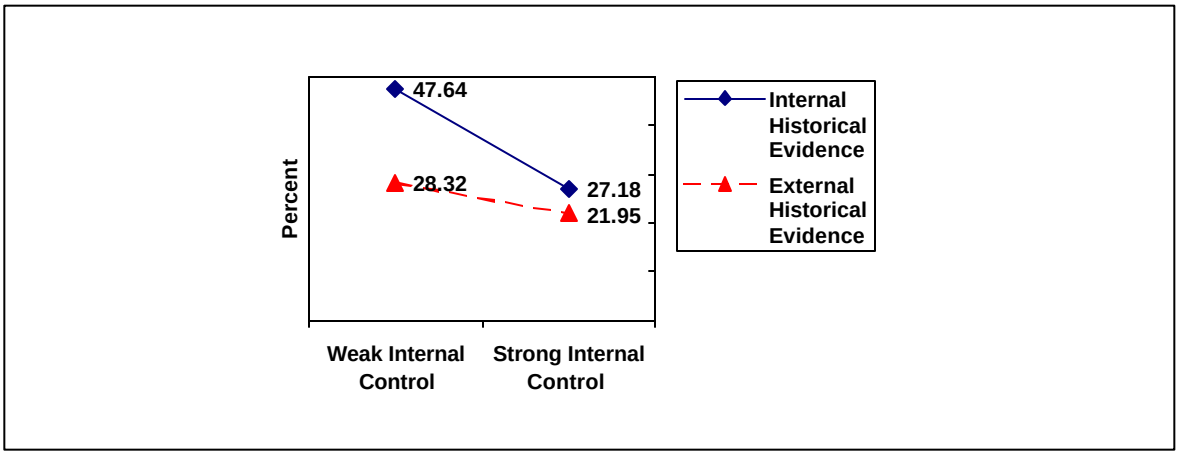
Panel A: Analysis of Variance with Percentage to Include in Allowance Account as the Dependent Variable

Treatment (n = 22)[a]	*Type III SS*	*df*	*MS*	*F-Statistic*	*p > F*
Source objectivity	3,313.64	1	3,313.64	16.52[b]	0.0006
Internal control effectiveness	3,955.68	1	3,955.68	15.69[c]	0.0007
Source objectivity * Internal control effectiveness	1,092.04	1	1,092.04	6.63[d]	0.0176

Panel B: Means of Percentage to Include in Allowance Account (Standard Deviations)

	Internal Control Effectiveness		
Source Objectivity (n = 22)	*Weak*	*Strong*	*Overall*
Internal historical evidence	47.64 % (33.78)	27.18 % (31.27)	37.41 % (33.79)
External historical evidence	28.32 % (30.68)	21.95 % (29.28)	25.14 % (29.81)
Overall	37.98 % (33.35)	24.57 % (30.05)	

Panel C: Graph of Interaction



[a] Results are shown for 22 subjects as two subjects failed to indicate the percentage of the material overdue account to include in the Allowance for Doubtful Accounts balance.

[b] Using Type III mean square for source objectivity ∗ subject as an error term.

[c] Using Type III mean square for internal control effectiveness ∗ subject as an error term.

[d] Using Type III mean square for internal control effectiveness ∗ source objectivity ∗ subject as an error term

Table 4
Analysis of Likelihood Allowance for Doubtful Accounts is Materially Correct – Evidence Set Size

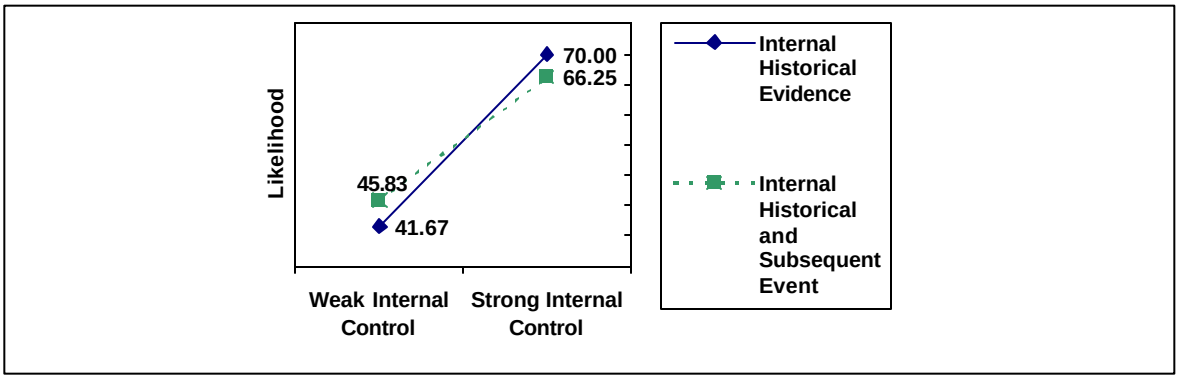
Panel A: Analysis of Variance with Likelihood Account is Materially Correct as the Dependent Variable

Treatment (n = 24)	*Type III SS*	*df*	*MS*	*F-Statistic*	*p > F*
Evidence set size	0.0001	1	0.0001	0.01[a]	0.9326
Internal control effectiveness	1.4259	1	1.4259	93.29[b]	< 0.0001
Evidence set size * Internal control effectiveness	0.0376	1	0.0376	3.76[c]	0.0648

Panel B: Means of Likelihood Account is Materially Correct (Standard Deviations)

	Internal Control Effectiveness		
Evidence Set Size (n = 24)	*Weak*	*Strong*	*Overall*
Internal historical evidence	41.67 % (18.57)	70.00 % (13.51)	55.83 % (21.52)
Internal historical and subsequent event evidence	45.83 % (19.32)	66.25 % (16.63)	56.04 % (20.60)
Overall	43.75 % (18.86)	68.12 % (15.11)	

Panel C: Graph of Interaction



[a] Using Type III mean square for evidence set size ∗ subject as an error term.

[b] Using Type III mean square for internal control effectiveness ∗ subject as an error term.

[c] Using Type III mean square for internal control effectiveness ∗ evidence set size ∗ subject as an error term

Table 5
Results: Analysis of Percentage to Include in Allowance for Doubtful Accounts – Evidence Set Size

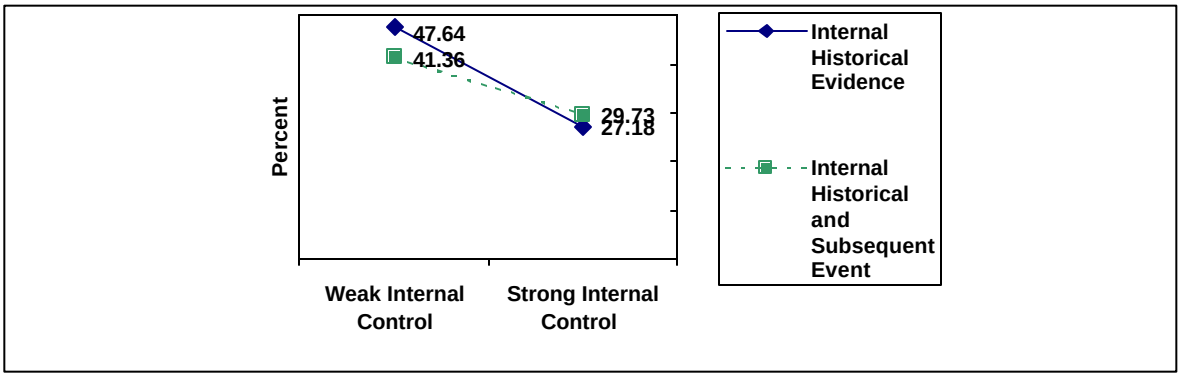
Panel A: Analysis of Variance with Percentage to Include in Allowance Account as the Dependent Variable

Treatment (n = 22)[a]	*Type III SS*	*df*	*MS*	*F-Statistic*	*p > F*
Evidence set size	76.41	1	76.41	0.30[b]	0.5899
Internal control effectiveness	5,664.04	1	5,664.04	11.66[c]	0.0026
Evidence set size * Internal control effectiveness	427.68	1	427.68	4.46[d]	0.0469

Panel B: Means of Percentage to Include in Allowance Account (Standard Deviations)

	Internal Control Effectiveness		
Evidence Set Size (n = 22)	*Weak*	*Strong*	*Overall*
Internal historical evidence	47.64 % (33.78)	27.18 % (31.27)	37.41 % (33.79)
Internal historical and subsequent event Evidence	41.36 % (32.27)	29.73 % (30.09)	35.55 % (31.39)
Overall	44.50 % (32.80)	28.45 % (30.35)	

Panel C: Graph of Interaction



[a] Results are shown for 22 subjects as two subjects failed to indicate the percentage of the material overdue account to include in the Allowance for Doubtful Accounts balance.

[b] Using Type III mean square for evidence set size ∗ subject as an error term.

[c] Using Type III mean square for internal control effectiveness ∗ subject as an error term.

[d] Using Type III mean square for internal control effectiveness ∗ evidence set size ∗ subject as an error term

Table 6
Results: Analysis of Likelihood Provision for Product Warranty Claims Account is Materially Correct – Source Objectivity

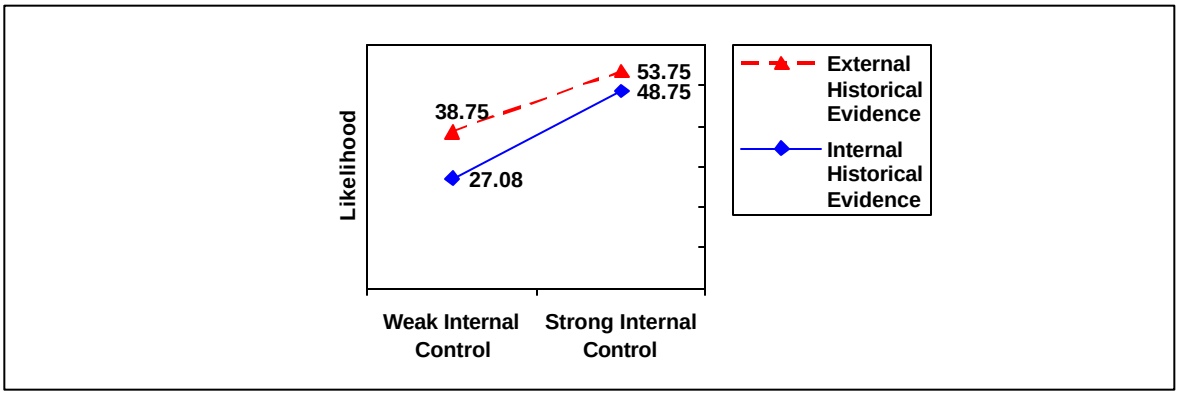
Panel A: Analysis of Variance with Likelihood Account is Materially Correct as the Dependent Variable

Treatment (n = 24)	*Type III SS*	*df*	*MS*	*F-Statistic*	*p > F*
Source objectivity	0.1667	1	0.1667	22.77[a]	< 0.0001
Internal control effectiveness	0.8067	1	0.8067	37.99[b]	< 0.0001
Source Objectivity * Internal control effectiveness	0.0267	1	0.0267	6.94[c]	0.0148

Panel B: Means of Likelihood Account is Materially Correct (Standard Deviations)

	Internal Control Effectiveness		
Source Objectivity (n = 24)	*Weak*	*Strong*	*Overall*
Internal historical evidence	27.08 % (19.67)	48.75 % (21.33)	37.92 % (23.06)
External historical evidence	38.75 % (20.07)	53.75 % (21.83)	46.25 % (22.09)
Overall	32.92 % (20.52)	51.25 % (21.50)	

Panel C: Graph of Interaction



[a] Using Type III mean square for source objectivity * subject as an error term.

[b] Using Type III mean square for internal control effectiveness * subject as an error term.

[c] Using Type III mean square for internal control effectiveness * source objectivity * subject as an error term

Table 7
Results: Analysis of Likelihood Provision for Product Warranty Claims Account is Materially Correct – Evidence Set Size

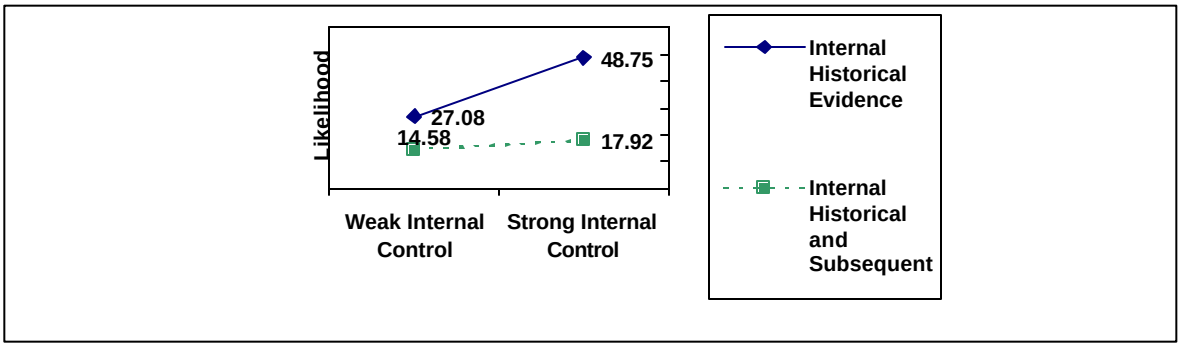
Panel A: Analysis of Variance with Likelihood Account is Materially Correct as the Dependent Variable

Treatment (n = 24)	*Type III SS*	*df*	*MS*	*F-Statistic*	*p > F*
Evidence set size	1.1267	1	1.1267	70.35[a]	< 0.0001
Internal control effectiveness	0.3750	1	0.3750	45.39[b]	< 0.0001
Evidence set size * Internal control effectiveness	0.2017	1	0.2017	32.36[c]	< 0.0001

Panel B: Means of Likelihood Account is Materially Correct (Standard Deviations)

	Internal Control Effectiveness		
Evidence Set Size (n = 24)	*Weak*	*Strong*	*Overall*
Internal historical evidence	27.08 % (19.67)	48.75 % (21.33)	37.92 % (23.06)
Internal historical and subsequent event Evidence	14.58 % (16.93)	17.92 % (16.68)	16.25 % (16.71)
Overall	20.83 % (19.22)	33.33 % (24.52)	

Panel C: Graph of Interaction

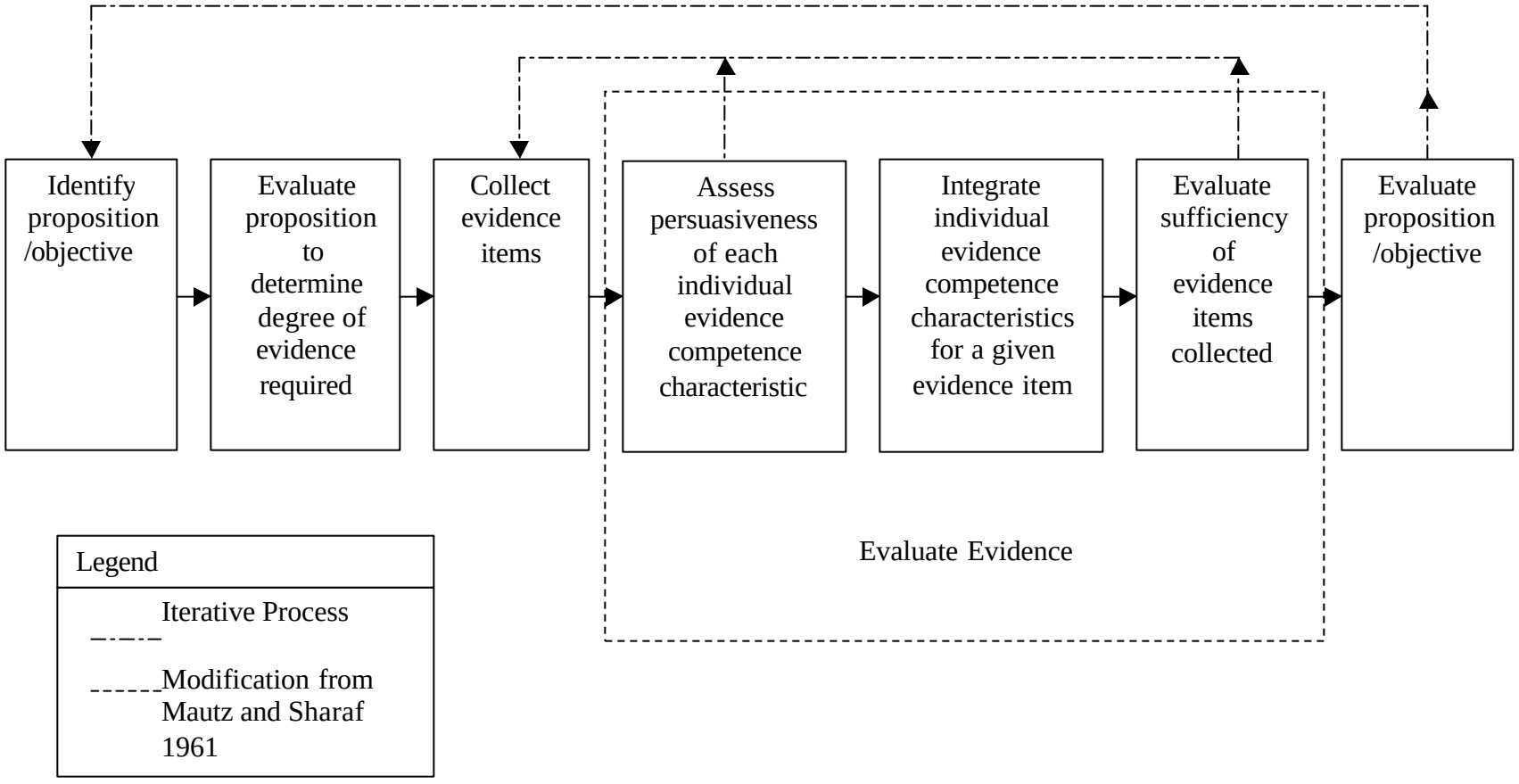


[a] Using Type III mean square for evidence set size ∗ subject as an error term.

[b] Using Type III mean square for internal control effectiveness ∗ subject as an error term.

[c] Using Type III mean square for internal control effectiveness ∗evidence set size ∗ subject as an error term

Figure 1
Judgment Formation Process[1]



[1] Adapted from Mautz and Sharaf, 1961. *The Philosophy of Auditing*. American Accounting Association.

Figure 2
Hypothesized Evidence Limitations by Internal Control Effectiveness Interaction

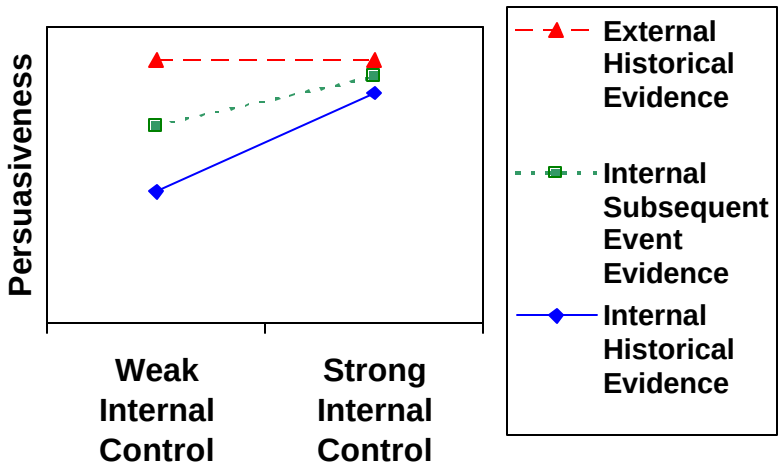


Figure 3
Summary of Experimental Hypotheses

Evidence Limitations[a]

H1a: μ[b] $_{\text{External Historical Evidence}} > \mu_{\text{Internal Historical Evidence}}$

H1b: $\mu_{\text{Internal Subsequent Event Evidence}} > \mu_{\text{Internal Historical Evidence}}$

Evidence Limitations by Internal Control Interaction

H2a: $[\mu_{\text{Internal Historical Evidence/Strong Internal Control}} - \mu_{\text{Internal Historical Evidence/Weak Internal Control}}] >$
$[\mu_{\text{External Historical Evidence/Strong Internal Control}} - \mu_{\text{External Historical Evidence/Weak Internal Control}}]$

H2b: $[\mu_{\text{Internal Historical Evidence/Strong Internal Control}} - \mu_{\text{Internal Historical Evidence/Weak Internal Control}}] >$
$[\mu_{\text{Internal Subsequent Event Evidence/Strong Internal Control}} - \mu_{\text{Internal Subsequent Event Evidence/Weak Internal Control}}]$

[a] Evidence limitations refers to lower evidence persuasiveness due to (1) the use of internal evidence rather than more competent external evidence, and (2) the use of historical evidence rather than more sufficient subsequent event evidence.

[b] μ represents mean persuasiveness.

Figure 4
Summary of Experimental Materials
Allowance for Doubtful Accounts Task

Panel A: Source Objectivity Manipulation

Internal historical evidence	In late December, you determined that the aging method has adequately provided for all probable losses except for one large material account which will be in the 90-120 days past due range as of December 31st. On December 31st, you obtained the following new information about this account from the *customer file provided by the client's credit manager*[a]: …..
External historical evidence	In late December, you determined that the aging method has adequately provided for all probable losses except for one large material account which will be in the 90-120 days past due range as of December 31st. On December 31st, you obtained the following new information about this account *directly from your contact at an independent credit agency:…*

Panel B: Evidence Set Size Manipulation

Common message[b]	The customer is a rapidly expanding merchandiser of personal computers, television, radio, stereo and other customer-electronics equipment. The customer began as a single-store operation in 1993 and now operates a total of 12 stores in three states. Further expansion is planned in the near future. Earnings growth has been strong since 1993. As the firm has expanded, its average payment time on accounts receivable has steadily increased. This is due to an inadequate accounting system rather than to cash difficulties. A new computerized accounting system is presently being developed and it is expected to remedy the firm's payment problems.
Additional message[c]	During follow-up work on January 5th, you learned from the updated customer file provided by the client credit manager that a partial payment for 4% of the outstanding balance was received yesterday.

[a] Italics was used to alert subjects to differences in the scenarios.

[b] The common message was included in all Allowance for Doubtful Account scenarios.

[c] This message was included for the evidence set size equals two scenario. For both evidence set size scenarios, subjects were told that the evidence was obtained from the customer file provided by the client credit manager (see the internal historical evidence scenario in Panel A).

Figure 4 (continued)
Summary of Experimental Materials
Allowance for Doubtful Accounts Task

Panel C: Internal Control Effectiveness Manipulation

Weak internal control effectiveness	Your review of credit policy in late December reveals that major changes to attract additional (potentially risky) customers have been implemented. Tests of the new policy find that several new customers who did not meet the client's minimum credit standard were granted credit. In addition, other new customers were added without proper credit approvals. Your review of the client's computerized sales system indicates that there have been significant problems modifying the system to reflect the new credit policy.
Strong internal control effectiveness	Your review of credit policy in late December reveals that the client has taken several steps in the past six months to strengthen credit quality. For example, the client now requires audited financial statements or two credit reports from independent sources before granting credit to any customer. In addition, the client has expanded its credit review procedures to ensure compliance with credit policy. Tests of credit policy and credit approval indicate that the new policy has been consistently applied. Your review of the client's computerized sales system finds that the system was properly updated to reflect the credit policy changes and that all controls are functioning adequately.

Figure 5
Summary of Experimental Materials
Provision for Product Warranty Claims Task

Panel A: Source Objectivity Manipulation

Internal historical evidence	In late December, you determined that the current warranty accounting policy has adequately provided for all probable losses except for the possibility of warranty claims from deluxe diesel engine sales. For the 4th quarter, 15% of the client's total sales were deluxe diesel engines. On *December 31st*, you obtained the following information about the deluxe diesel engine warranty claims from a *product status memo prepared by client management*[a] :….
External historical evidence	In late December, you determined that the current warranty accounting policy has adequately provided for all probable losses except for the possibility of warranty claims from deluxe diesel engine sales. For the 4th quarter, 15% of the client's total sales were deluxe diesel engines. On *December 31st*, you obtained the following information about the deluxe diesel engine warranty claims from *your contact at the leading engine testing facility*:….

Panel B: Evidence Set Size Manipulation

Common message[b]	The deluxe diesel engine was introduced this past March in response to growing demand for a high performance engine. The product presently has a 20% share of the high performance engine market. As the deluxe diesel engine's market share has grown, the percent age of warranty claims to sales has steadily increased. Tests conducted by our engineers indicate poor installation instructions, rather than product quality problems, may be triggering the claims. Revised installation instructions are presently being developed.
Additional message[c]	During follow-up work on January 5th, you learned from a memo shared with you by client management that a program to recall deluxe diesel engines began yesterday.

[a] Italics was used to alert subjects to differences in the scenarios.

[b] The common message was included in all Provision for Product Warranty Claims scenarios.

[c] This message was included for the evidence set size equals two scenario. For both evidence set size scenarios, subjects were told that the evidence was obtained from the product status memo prepared by client management (see the internal historical evidence scenario in Panel A).

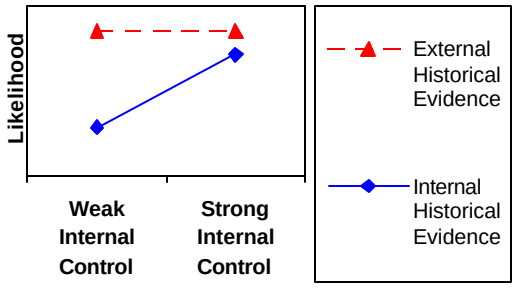
Figure 5 (continued)
Summary of Experimental Materials
Provision for Product Warranty Claims Task

Panel C: Internal Control Effectiveness Manipulation

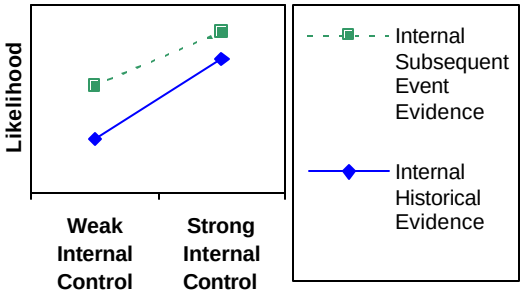
Weak internal control effectiveness	Your review of the product warranty procedures in late December reveals several major shortcomings in the past six months. For example, the client does not require that all large warranty claims be reviewed and approved by client management before payment is made. In addition, the client's new product warranty tracking system has been delayed due to software problems. The system, which will match product warranty claims directly to products, should be in place within six months. The client's current product warranty tracking system is an end user computing system consisting of several spreadsheets prepared and maintained by two clerical employees. Your review indicates the current system is inefficient. The system's developer, the client's senior product warranty clerk, had a stroke in July. Her replacement appears competent but overwhelmed with her new duties.
Strong internal control effectiveness	Your review of product warranty procedures in late December reveals that the client has taken several steps in the past six months to reduce the risk that the Provision for Product Warranty Claims account is understated. For example, the client requires all product warranty claims greater than $50 to be reviewed and approved by client management before payment is made. In addition, the client developed a new product warranty tracking system. This system traces product warranty claims to specific engine products by requiring the appropriate engine product number to be recorded before any warranty claim can be paid. Tests of product warranty procedures indicate that the new procedures have been consistently applied. Your review finds that the client's computerized product warranty tracking system is functioning properly and that all controls appear to be working adequately.

Figure 6
Summary of Experimental Design
Allowance for Doubtful Accounts Task

Panel A: Likelihood Account is Materially Correct as the Dependent Variable

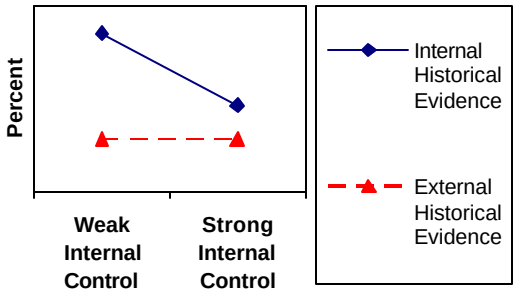


Interaction Predicted by H2a

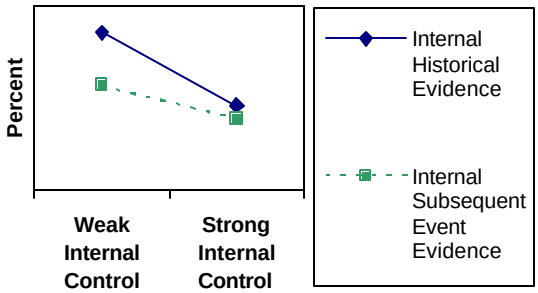


Interaction Predicted by H2b

Panel B: Percent to Include in Allowance Account as the Dependent Variable



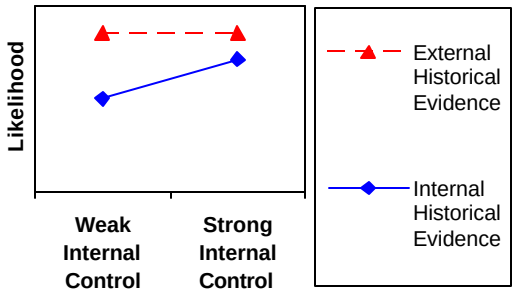
Interaction Predicted by H2a



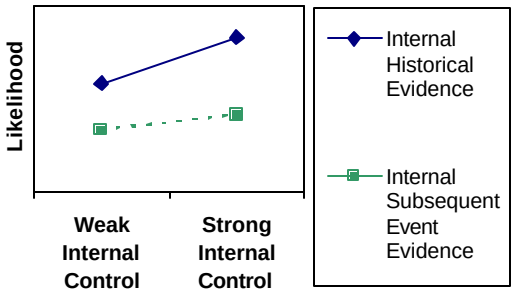
Interaction Predicted by H2b

Figure 7
Summary of Experimental Design
Provision for Product Warranty Claims Task

Panel A: Likelihood Account is Materially Correct as the Dependent Variable



Interaction Predicted by H2a



Interaction Predicted by H2b