

The Effect of Alternative Methods of Review on Auditors' Accountability and Performance

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ABSTRACT

We compare effects of anticipating three methods of review (electronic, discussion, and interview) on preparer accountability and performance. In additional analyses, we examine the processes by which accountability operates to affect performance. Participating auditors complete work related to the audit of accounts receivable, and based on the evidence they choose to examine, they prepare workpaper documentation. Participants then complete a debriefing questionnaire containing our measure of accountability. Using path analysis, we test our model of the effects of method of review on accountability, performance, and documentation. Results show that participants exhibited relatively high levels of accountability under each method of review, with those expecting an electronic review reporting significantly greater accountability than those expecting an interview. Preparers respond to the intensity of accountability and the focus of the review (i.e., mechanical vs. judgmental issues). We also find that accountability has both direct and indirect effects on performance and documentation. A task analysis of review allows us to provide guidance on the implications of one type of review over another and suggests that accountability effects will likely differ across audit tasks being reviewed. These results are relevant to practitioners interested in enhancing overall audit effectiveness through both error detection and workpaper documentation.

I. INTRODUCTION

Workpaper review is an important source of audit quality control and feedback. Audit standards require review to ensure that assistants adequately perform their work and that documentation supports the audit opinion (AICPA 2006a). Audit firms also rely on review to help train inexperienced auditors (Libby 1995). The review process may affect how well preparers perform their audit procedures (Kennedy 1993; cf. Fellingham and Newman 1985) because individuals select decision strategies by anticipating demands of their environment (Payne 1982; DeZoort and Lord 1997; Frink and Ferris 1998; Dowling 2009).

Given the importance of the audit review process, we examine how review improves audit task performance. We compare the three main methods of review (electronic, discussion, and interview, which we describe shortly). Prior research theorizes that review type affects performance through its impact on accountability, and we test this conjecture. More specifically, we develop a measure of accountability that we use to (1) measure the accountability associated with workpaper review, (2) determine whether different methods of review induce different feelings of accountability, and (3) determine whether the differences in accountability affect audit performance. In additional analyses, we also examine the processes by which accountability operates to affect performance. While some existing research suggests that choice of review method does affect audit performance, the research is limited and neither models the role of accountability nor compares the three primary methods of review simultaneously. Moreover, our study unlike prior research examines preparers performing detailed audit program steps. Our task analysis of review suggests

accountability effects will differ across audit tasks. This is relevant information for reviewers as Agoglia et al. (2010) find that reviewers' choice of review method is a conscious decision.

Different methods of workpaper review have developed over the years. Traditionally, reviewers performed their review after the completion of an audit area. The reviewer would read through the audit documentation, write questions and give the written questions to the preparer to answer. Changes in technology and efforts to make the review process more effective and efficient have resulted in additional methods for conducting audit reviews. Often, reviewers independently examine audit workpapers and prepare written review notes in the traditional method but then email their review notes to the preparer for follow up or input into the audit support system. In this *electronic review*, the reviewer can conduct the review without being physically present at the audit site. Preparers can formulate responses to reviewers' comments when convenient. A second method follows the review of audit workpapers and preparation of written review notes with a face-to-face discussion of the written comments with the preparer. This *discussion* review permits reviewers to elaborate on their written comments and to obtain immediate responses, so preparers must respond "on the spot" to the reviewer's inquiries (Brazel et al. 2004).

A third form of review is a review by interview (Rich et al. 1997; Gibbins and Trotman 2002; Miller et al. 2006; Payne et al. 2010). A real-time *interview* does not require the initial preparation of review notes like the other two review methods since the reviewer performs the review in the presence of the preparer. This allows reviewers to probe the preparer about the work performed, and it facilitates interaction between

the reviewer and preparer. There is very limited research on reviews by interview although all three methods are commonly used in practice. For electronic, discussion, and interview (respectively), our data show the following usage: 27%, 46%, and 27%.¹ Our conversations with practitioners suggest that more experienced auditors prefer interviews and they tend to focus more on conceptual issues.

We manipulate the three common methods of review (electronic, discussion, and interview) in a 1 x 3 between-subjects design. Participating auditors complete work related to the audit of accounts receivable and prepare workpaper documentation. Using path analysis, we test our hypothesized model of the effects of method of review on accountability, performance, and documentation. Results show that participants exhibited high levels of accountability under each method of review, with those expecting an electronic review reporting significantly greater accountability than those expecting an interview. We also find that accountability has both direct and indirect effects on performance and documentation. Although examining more evidence improves identification of client errors, it reduces the extent of workpaper documentation probably because of a trade-off between time spent examining evidence and time spent documenting.

Our results also show auditors' anticipation of certain review methods causes them to focus on certain types of errors. Auditors anticipating an interview detect more conceptual errors than auditors anticipating either electronic or discussion reviews. This result is not related to level of accountability or effort expended; rather, it reflects a shift in focus to conceptual issues when an interview is expected. Auditors expecting an interview also prepare less extensive workpaper documentation than those anticipating

¹ Fargher et al. (2005) report the following usage for Australia: 34%, 25%, and 37%.

electronic review. These results are relevant to practitioners interested in enhancing overall audit effectiveness through both error detection and workpaper documentation.

This study makes several contributions to the literature. We perform a task analysis of review and identify the accountability implications of each review method. This analysis provides the basis for our accountability-based model of review. We measure the effect of the three primary methods of review on auditors' feelings of accountability, and we measure the effect of accountability on audit performance and documentation. While prior research conjectures that the effects of choice of review method operate through accountability, there has been no empirical evidence of this conjecture. We show that the choice of review does affect accountability and that accountability has both direct and indirect effects on performance. We supplement our findings by examining cognitive links between accountability and auditor performance and documentation.

We use a task in which auditors perform actual audit procedures, interpret the evidence they collect, and document their work, which is different than most previous studies. For example, in Brazel et al.'s (2004) going concern task auditors recommend a going concern judgment to their superiors. However, our study simulates much audit work that consists of the auditor performing and documenting detailed audit steps with the auditor taking complete ownership of the audit conclusion. Our task analysis suggests that accountability will operate differently across different tasks and, in fact, some of our results differ from prior research. In particular, we find significant differences associated with interview reviews rather than between electronic and

discussion reviews which was the focus in Brazel et al. (2004). An important implication of our results is that the effects of review method on audit quality can be task specific.

Finally, our study's series of connected tasks allows us to distinguish between performance related to conceptual errors and mechanical errors. Previous research indicates that auditors' performance on these two types of errors can be very different (e.g. Ramsay 1994) and we find that review method differentially effects performance related to these error types. Accordingly, we show that review method has both level and directional accountability effects on performance.

The next section of the paper describes the prior research and develops the study's hypotheses. We describe our research method in Section III, results in Section IV, and discuss these results and implications for practice in the last section.

II. BACKGROUND AND HYPOTHESIS DEVELOPMENT

As review is such an important component of audit quality and auditors use several methods of review in practice today, a growing body of research attempts to understand the implications of these different methods on preparers and overall audit quality. Table 1 summarizes these studies. Several studies show process gains (e.g., a greater number of more plausible explanations) due to adding discussion during review (e.g. Ismail and Trotman 1995, Miller et al. 2006). Other studies suggest discussion that takes place while the review is being performed (i.e., interviews) is not preferable to discussion of independently written review notes (Favere-Marchesi 2006) but is preferable to emailed review notes with no discussion (Payne et al. 2010).

Brazel et al. (2004) use a going-concern judgment to explore the effects of anticipating a discussion review compared to electronic review. They find preparers who

anticipate face-to-face discussion report greater feelings of accountability. They show that preparers expecting a discussion review have higher quality workpapers (assessed by three experts) and their judgments deviate less from the experts' judgments, but are less efficient than preparers expecting electronic reviews. While this prior research often relies on accountability to motivate their hypothesized effects, only Brazel et al. (2004) actually measure accountability, but they do not actually test for an effect of accountability. Two additional studies examine how the review method (discussion vs. electronic) affects the *reviewer*. Agoglia et al. (2009) examine the effects of review method on reviewer's assessments of going concern and documentation quality, while Agoglia et al. (2010) examine the reviewer's choice of method given varying levels of misstatement risk and workload pressure. They find that auditors make a conscious choice of review method and that risk and workload pressure interact to affect reviewers' planned review method for the sales and collection cycle.

(Insert Table 1 here)

Accountability

Accountability is the implicit or explicit expectation that one may be called upon to justify one's beliefs, feelings, and actions to others (Lerner and Tetlock 1999). All review methods induce accountability since preparers have to answer to reviewers (Johnson and Kaplan 1991). In this section we examine various aspects of the three methods of audit workpaper review and their effects on preparer's feelings of accountability. To facilitate this discussion we have summarized these aspects in Table 2.²

(Insert Table 2 here)

² For a comprehensive review of accountability studies in auditing see Bonner (2008).

Lerner and Tetlock (1999, 255) describe several distinct aspects of accountability, including the (a) mere presence of another, (b) identifiability of the person held accountable, (c) expectation of an evaluation, and (d) expectation of giving reasons for actions. All of these aspects are present in all three methods of audit review. Lerner and Tetlock (1999, 259) also describe special types of accountability that elicit open-minded, critical thinking. These include accountability "...to an audience (a) whose views are unknown, (b) who is interested in accuracy, (c) who is interested in processes rather than specific outcomes, (d) who is reasonably well-informed, and (e) who has a legitimate reason for inquiring into the reasons behind participants' judgments." Again, all of these types of accountability may be present in all three methods of review.³ Accountability is also greater when one must justify his/her decision and will receive feedback (DeZoort et al. 2006), which is also typical in all three methods of audit review.

Auditors are called upon to justify their actions and judgments during the review process through either a written (emailed notes) or verbal process (interview), or a combination of both (discussion of written notes). We conducted extensive interviews with practitioners at all levels to ascertain the characteristics of the three methods of review. These are discussed below along with results from the limited prior research.

Face-to-face interaction requires immediate responses to reviewers' questions. It opens the door to unanticipated questions, which typically would not be the case with

³ In many cases, reviewers' views may be known by preparers, but this is not the case in our study. Additionally, reviewers are interested in both processes and outcomes, as reviewers focus on determining whether audit procedures performed (sufficient, reliable evidence) support the outcome (opinion) (AICPA 2006a).

written comments only. Thus, the unpredictability and necessity to respond immediately in face-to-face interaction should enhance accountability in both interview and discussion-type reviews. Prior research shows face-to-face discussion of review notes engenders a greater feeling of accountability in preparers than receipt of written notes with no discussion (Brazel et al. 2004). Payne et al. (2010) suggest interviews create similar feelings of accountability as discussion of written notes because, in addition to being “put-on-the-spot” and being required to make immediate responses during discussion, the interview scenario also results in preparers witnessing reviewers’ initial reactions to their work.

When auditors receive electronic review notes they have the opportunity to read and absorb the comments in isolation, taking time to carefully draft responses to those comments, usually with the benefit of reviewing audit evidence and their procedures before responding. The lack of immediate face-to-face contact when electronic notes are received may result in lower feelings of accountability compared to the other methods of review where verbal communication is involved. Therefore, the face-to-face contact and verbal communication during audit review may enhance accountability, whether it results from discussion of written notes or from interviews.

Conversely, practitioners tell us they feel *more* stress when facing reviews without discussion because they will not have a chance to explain their work. Moreover, an interview may engender *reduced* feelings of accountability because an auditor knows there will be opportunity during the interview to provide enhanced explanations. An interview is the reviewer’s first look at the workpapers, so preparers may have more opportunity to manage the flow of the discussion by directing their responses in an

opportunistic manner, thus reducing accountability. This opportunity arises partly because of an increased cognitive load on the reviewer who is simultaneously gaining his/her own understanding of the task, while also reviewing and interacting with the preparer (Favere-Marchesi 2006). In contrast, electronic review notes are typically prepared in isolation from the preparer, and tend to be very structured so the opportunity for managing the discussion is less.

In addition, practitioners inform us that written review notes are often attached to and remain in the audit support system during the engagement and, therefore, become visible to other members of the engagement team, particularly superiors. Written comments potentially expand the visibility of an auditor's performance from the reviewer to the entire engagement team, thus enhancing accountability. Finally, reviewers are generally less harsh when there is face-to-face interaction with the preparer (Waung and Highhouse 1997) thus reducing accountability for interviews and discussion-type reviews.

In summary, while it is clear that workpaper review enhances accountability, it is likely that the degree of accountability caused by each method of review depends on the nature of the task performed. As shown in Table 2, each method of review has characteristics that increase and decrease accountability related to the other review methods. In the structured task used in our study, preparers complete a series of detailed audit steps. The documentation of the audit procedures performed and evidence collected provides opportunities for more written review notes compared to a less structured, subjective task. Accordingly, the more relevant aspects of review in our task (from Table 2) are (1) structured review with little opportunity for preparer to

change the course of the review, and (2) outcome of the review typically visible to others on the engagement team. Other aspects of review will be less important, including the potential to be asked for additional justification during face-to-face interaction and the opportunity for additional explanation prior to reviewer's opinion being formed⁴. Consequently, while we expect different methods of review to engender different intensities of accountability feelings, in our study we hypothesize that electronic review will induce relatively more accountability than the other two methods.

H1: Accountability differs in intensity depending upon the method of review expected. In a structured task, involving the review of detailed audit steps, electronic review is likely to induce relatively more accountability than interviews or discussions.

Reactions to Accountability

People respond to accountability by using decision heuristics deemed acceptable to the audience when possible, and otherwise use increased cognitive complexity and vigilance (Lerner and Tetlock 1999). Accountability increases cognitive effort when preferences of the person to whom one is accountable are not known (Gibbins and Newton 1994), and also increases accuracy and consensus and improves self-insight (Ashton 1990; Johnson and Kaplan 1991).

Figure 1 summarizes our theoretical framework. We expect auditors to respond to accountability with increased vigilance and more complex cognitive activity. The expectation of justifying judgments leads to a more effortful and self-critical search for reasons to justify action that "...leads participants to (a) survey a wider range of conceivable relevant cues; (b) pay greater attention to the cues they use; (c) anticipate

⁴ With a less structured subjective task, such as the going concern judgment used in some previous research, these aspects of review would be relatively more important and, accordingly, discussion and interview would likely engender greater feelings of accountability.

counter arguments, weigh their merits relatively impartially...and (d) gain greater awareness of their cognitive processes by regularly monitoring the cues that are allowed to influence judgment and choice” (Lerner and Tetlock 1999, 263).

(Insert Figure 1 here)

Our first performance measure involves mechanical error detection. Mechanical errors are objective, verifiable and concrete (Ramsay 1994). For example, improper aging of an account receivable on the aging schedule is a mechanical error. Detection is essentially a process where one item is compared to another in accordance with the audit program instructions. Auditors apply procedures such as tracing, vouching, comparing documents for specific items, reviewing the evidence for unusual items, etc. In terms of cognitive processing, detection of mechanical errors is easier than detection of conceptual errors (see discussion below), yet performance should still be enhanced when auditors feel a heightened sense of accountability, as they will pay closer attention to the cues (audit evidence) they use (Lerner and Tetlock 1999) thus increasing the detection rate of mechanical errors. For example, paying closer attention decreases the possibility of overlooking inconsistent items such as dates or amounts when making comparisons.

H2: Accountability is positively associated with mechanical error detection.

Our second measure of performance involves conceptual errors. Conceptual errors are subjective, unverifiable and imprecise (Ramsay 1994). For example, improper revenue recognition is often a conceptual error. Given the complexity of cognitive processing required with conceptual issues (e.g. choice of relevant vs. irrelevant cues, number of cues examined, number of hypotheses generated, etc.), we focus on whether

auditors correctly solve a conceptual issue. Enhanced accountability will result in increased conceptual error detection. As with mechanical error detection, auditors who feel increased levels of accountability will pay closer attention to the cues used, and will also consider a wider range of relevant cues, anticipate counter arguments, weigh their merits relatively impartially, and regularly monitor the cues allowed to influence judgment and choice (Lerner and Tetlock 1999). Solving a conceptual error requires a great deal of cognitive processing to thoroughly understand the dimensions of the problem.⁵ Thus all of these reactions to accountability that lead to more effortful processing as suggested by Lerner and Tetlock (1999) will enhance the auditor's ability to arrive at the correct conclusions when analyzing conceptual errors.

H3: Accountability is positively associated with correct solutions to conceptual errors.

Our final performance measure relates to the extent of audit documentation prepared. Auditors must document the procedures performed, evidence obtained, and conclusions reached (AICPA 2006b). Documentation must be extensive enough to clearly demonstrate that the work was in fact performed and to enable an experienced auditor, having no previous connection with the engagement to understand the procedures performed, evidence obtained, and conclusions reached, (PCAOB 2004, para. 6). Additionally, audit documentation must include information the auditor has identified relating to significant findings or issues that are inconsistent with, or contradict the auditor's final conclusions. (PCAOB 2004, para. 8). Accountability's effect on documentation is twofold. First, detecting more mechanical errors and solving more

⁵ Knowledge and ability will also affect conceptual error performance (Bonner and Lewis 1990), and this is captured in our control variable, accounts receivable experience.

conceptual errors (H2 and H3) will inevitably increase the amount of audit documentation since standards require documentation of all exceptions. Therefore, this effect of accountability on documentation is indirect, resulting from improvements in performance. The second effect is a direct link between accountability and documentation. The same effortful, vigilant processing that enhances performance on the task itself should also be reflected in a more thorough and elaborate explanation of procedures and findings. In other words, accountability will enhance workpaper preparation, regardless of the number of errors discovered.

H4a: Detection of mechanical errors is positively associated with the extent of documentation.

H4b: Solving conceptual errors is positively associated with the extent of documentation.

H4c: Accountability is positively associated with the extent of documentation.

III. RESEARCH METHOD

Participants

A total of 148 auditors from all of the Big Four accounting firms participated in the study. Four participants were discarded from the final sample because their computer data were not recorded on the USB drive (see materials below). In addition, 23 auditors were discarded because they did not fully complete the task based on examination of their workpapers and the evidence they viewed. Another participant was classified as an

outlier and dropped.⁶ This results in a final sample size of 120 auditors - 39 in the interview group, 44 in the discussion group, and 37 in the electronic group.

Materials and Procedures

The case used in this study involved performing auditing procedures relating to accounts receivable. This case was developed specifically for this study and extensively pilot tested with graduate audit students. Participants were given a packet that contained written instructions, consent forms, written audit program instructions, a hardcopy workpaper, and a USB drive. The audit program and workpaper are included in the appendix. The USB drive contained a computer program that began with background information about a hypothetical client and a statement regarding the method of review the participant would receive upon completion of the audit procedures if s/he were selected for review. On the next screen, all of the documents needed to perform the audit task were provided, including confirmations, invoices, purchase orders, bills of lading, subsequent cash receipts, and notes previously prepared by a hypothetical assistant auditor. After completing the audit task, the final screens in the computer program collected demographic data and answers to the accountability scale questions.

Participants completed the audit task by referring to the written audit program procedures, accessing the client's documents via the computer program, and completing the hardcopy audit workpaper. The workpapers contained an aging schedule with additional columns to add tickmarks indicating completion of the audit program steps. Participants were instructed to write their e-mail addresses on the

⁶ This participant was the only one to prepare typed comments; all others were hand-written. Furthermore, this participant was deemed to have copied and pasted parts of the instrument into his/her documentation resulting in a far greater word count than other participants.

hardcopy materials returned to the researcher. Email addresses were also recorded in the computer data so that written and computer-recorded responses could be matched. This information also provided a means for selecting auditors to review upon completion of their work.

The experiment was administered via two methods.⁷ For 63 of the final sample participants (52%), the experiment was administered in a classroom setting during a firm training class with two of the researchers present, as well as two research assistants. For the other 58 participants (48%), the experimental materials were sent to a firm contact person who distributed the packets to the auditors. These participants completed the experiment on their own time and returned all materials to the firm contact person upon completion. In both methods, different versions of the experiment were randomly assigned to participants.

Measurement of Variables

Method of Review Manipulation

In the introductory part of the experiment, participants were told they may be selected to have their workpaper reviewed by a manager/senior in their firm upon completion. This information referred to one of three methods of audit review: an interview, a written review with follow-up discussion, or an electronic review. The exact manipulations are as follows: *“Upon completion of your work in this study, some auditors will be selected to have their work reviewed. If you are selected for review,*

⁷ We noted significant differences in some variables due to administration method. Upon further analysis we determined that these differences were due to participants in the classroom setting having more experience than others. Experience is controlled for in the statistical analyses. Furthermore, adding an administration variable to the path analysis along with the experience variable has no effect on the reported results.

1. *You will be interviewed by a manager/senior who will perform the review in your presence so that s/he may conveniently inquire as to any issues that may arise.*
2. *Your workpapers will be given to a manager/senior in your firm who will perform the review and write comments. Upon his/her completion of the review, s/he will call you in to discuss those comments with you.*
3. *Your workpapers will be given to a manager/senior in your firm who will perform the review and write comments. Upon his/her completion of the review, s/he will e-mail those comments to you.”*

After reading the information relating to one of these manipulations, participants were presented with the following check question and possible responses: *If I am one of the auditors selected to have my work reviewed, a manager/senior will: 1) I don't know, 2) Interview me, 3) Write comments and then discuss them with me, 4) Send me written comments via e-mail.* If the wrong response was selected, the computer program would alert the participant and force the auditor to re-read the information in order to fully understand the method of review s/he would potentially receive.⁸

Accountability

Responses to the scale questions for accountability (ACCT) were measured on a 7-point (low to high) scale. The scale for accountability was developed specifically for this study. We started with the accountability question used in Brazel et al. (2004) - our question #1. We then created four additional questions to achieve a five-item scale as follows: (1) *How accountable to the reviewer do you feel?* (2) *How motivated were you to perform well?* (3) *How much mental effort did you expend performing the task?* (4) *To what extent were you consciously aware that your work will be reviewed?* (5) *How important was it for you to perform well?* Cronbach's Alpha for these five items is .85.

Error Detection and Documentation

⁸ Managers in the firms actually performed 30 reviews.

Within the experimental materials, several errors were either embedded in the hypothetical client's actual documents or referenced in preliminary notes made by a hypothetical assistant auditor (who did not always draw the proper conclusion). The nature of each error is described in Table 3.⁹

(Insert Table 3 here)

The workpapers for each participant were reviewed and coded by all 3 researchers and a research assistant blind to the experimental treatment. The coding measures used were as follows: 0 = error not detected; 1 = the error was noted but was not completely or properly described; 2 = the error was completely and properly described. Inter-rater reliability analyses indicate good consistency with a coefficient of .91 (MacLennan 1993).¹⁰ We computed a sum of the coding scores for mechanical errors (MECH); however, for conceptual errors, we only counted whether the participant successfully determined a resolution of the matter (i.e., CONC=2) because the problem itself was described in the case under "assistant's notes". A measure of documentation effort (DOC) was obtained by using a count of the total number of words written on the workpaper.¹¹

IV. RESULTS

Demographics

Table 4 shows demographic variables in total, as well as by method of review. On average, participants were 26.4 years old, with 33.9 months of audit experience and 4.8 previous audits of accounts receivable. The sample is evenly split on gender, with

⁹ The first conceptual error was modified from Asare et al. (2007). We thank the authors for their permission.

¹⁰ For instances where all raters did not initially agree, the item was discussed and ultimately decided to the satisfaction of raters.

¹¹ This variable was highly skewed, requiring a square root transformation.

52% being male. Participants report receiving the three methods of review in actual practice as follows: interviews 27%, discussion 46% and electronic 27%. T-tests for group comparisons revealed no significant differences in demographics between the three treatment groups, indicating effective random assignment.

(Insert Table 4 Here)

Descriptive Statistics

The descriptive statistics for all variables are shown in Table 5. Accountability is significantly above the scale midpoint (17.5) overall (24.4, $p=.00$) and for each method of review (interview: 22.9, $p=.00$; discussion: 24.6, $p=.00$; electronic: 25.8, $p=.00$). Accountability is highest for electronic reviews and lowest for interviews; this difference is significant ($p < .05$). Accountability for discussion reviews lies between the other two and is not significantly different from either. On average, participants took just under an hour (57.6 minutes) to complete the task, examining 82 documents (including repeatedly going back to the same document) and writing 243 words in tickmark explanations and additional comments. They identified 1.3 of the three conceptual errors embedded in the case and scored 8.3 out of 28 for their mechanical error performance.

(Insert Table 5 Here)

Path Analysis

We use path analysis to test our hypotheses so that both direct and indirect effects can be examined, and so that demographic effects can be controlled.¹² Figure 2 presents the results of the path analysis. In addition to testing the paths outlined in

¹² Though structural equation modeling (SEM) typically requires a larger sample (Bentler and Chou 1987), we also ran SEM to assess our overall model fit. The results were nearly identical and model fit was good; RMSEA = 0.015 (Hair et al. 1998).

Figure 1, we included a control variable for experience (AR EXP¹³) and tested for the possibility of direct effects of method of review on performance though none were predicted. Only the significant paths are shown in Figure 2 along with the standardized coefficients. For the method of review variable, we constructed dummy variables for written review with discussion (DISC) and review by interview (INT), with electronic review as the referent variable. DISC was not significantly different from electronic review on any of the paths.

Our first hypothesis predicts differences in accountability associated with the different review methods and, in particular, that electronic review is likely to induce relatively more accountability. The results in Figure 2 and from Table 5 show preparers anticipating an interview feel significantly less accountable than those expecting an electronic interview ($\beta = -.20$, $p = .03$). Consequently, H1 is partially supported in that electronic review induces more accountability than interview, but not discussion reviews.

We predict that accountability will enhance detection of mechanical errors (H2) and correct solutions of conceptual errors (H3). H2 is supported since the path between accountability and mechanical error detection is significant ($\beta = .21$, $p = .02$). H3 is not supported, as the path between accountability and conceptual errors is not significant. However, there is a direct effect of method of review on solution of conceptual errors. Auditors expecting an interview solved significantly more conceptual errors correctly than those expecting an electronic review ($\beta = .23$, $p = .02$). This is particularly interesting

¹³ For some variables there were significant differences between demographic groups. Only one control variable (AR EXP) is included in the path model to reduce complexity. However, additional tests show the use of different control variables (position in the firm, overall audit experience, etc.) in place of AR EXP does not change the significance of the results.

given that electronic reviews increase the level of accountability. These results suggest auditors likely anticipate the interview will be more of a conceptual nature and thus focus their efforts accordingly, regardless of accountability's intensity.¹⁴

We also predict a positive relationship between documentation and detection of mechanical errors (H4a), correct solution of conceptual errors (H4b), and accountability (H4c). Figure 2 shows support for all of these hypotheses ($\beta=.21$, $p=.02$; $\beta=.33$, $p=.00$; $\beta=.17$, $p=.05$; respectively). As expected, the increase in documentation is related to performance on the task itself (H4a and H4b). Accountability indirectly affects documentation through mechanical errors, but not through conceptual errors. Finally, the direct link between accountability and documentation suggests that this relationship exists regardless of performance on the task. Even after controlling for the number of mechanical errors detected and conceptual errors correctly solved, there is still a positive influence on the extent of documentation.

V. ADDITIONAL ANALYSIS

To further explore the links between accountability and our performance measures, we examined the cognitive processes involved. Comprehension involves several broad, general principles – 1) information to be learned must be attended to, 2) a certain amount of practice or repetition is necessary for learning, 3) new information is organized and related to information already known, and 4) the outcome of learning is the consolidation of new and old information (Baddeley 1990). The amount of time spent in the learning process is positively related to comprehension (Baddeley 1990),

¹⁴ This is consistent with our discussions with practitioners, who indicated interviews are more often performed by higher level reviewers, who concentrated on conceptual matters. One senior manager noted that interviews are more likely to take place late in an audit because that is when key issues get addressed.

since practice/repetition increases the strength of memory traces and increases automation of processes (Anderson 2000, Baddeley 1990). Information processed more deeply strengthens memory and is less rapidly forgotten (Anderson 2000). In addition, Lerner and Tetlock (1999) describe effortful and self-critical processing as paying greater attention to the cues used, as well as using a wider range of relevant cues.

In our accounts receivable audit task the time spent on the task (in minutes) and the amount of evidence examined (a summation of the number of times participants opened each piece of audit evidence) are proxies for cognitive processing. We examine a relationship between accountability and these cognitive processing proxies, as well as between these proxies and our performance measures. Descriptive statistics for both proxy variables are shown in Table 5.

The results of path analysis using these cognitive processing measures as the links between accountability and performance are consistent with cognitive theory and are illustrated in Figure 3.¹⁵ Accountability directly affects time spent on the task ($\beta=.35$, $p=.00$), which directly affects the amount of evidence examined ($\beta=.36$, $p=.00$). Through this time and evidence link, accountability has an indirect and positive effect on detection of mechanical errors and solving conceptual errors. The direct effect of accountability on detection of mechanical errors is still evident in this model ($\beta=.20$, $p=.03$) even with the cognitive processing measures present.

The results reveal an interesting relationship between the cognitive processing measures and documentation. As mentioned above, time spent on the task has a positive effect on the amount of evidence examined ($\beta=.36$, $p=.00$) and the amount of

¹⁵ For ease of illustration, only paths originating with ACCT are shown in Figure 3. However, all variables were included in the path model. Variables included but not illustrated are Discussion, Interview, and Accounts Receivable Experience.

documentation ($\beta=.41$, $p=.00$), but the amount of evidence examined has a negative effect on the amount of documentation ($\beta=-.25$, $p=.00$). These results reflect the typical tradeoff auditors make under time constraints; more time spent examining evidence leaves less time to document findings. Finally, with all variables in this full model, there is a marginal direct effect of method of review on documentation; auditors expecting an interview document less than those expecting an electronic review ($\beta=-.13$, $p=.10$). The direct effect of review method on solution of conceptual errors is also still significant ($\beta=.23$, $p=.01$).

VI. DISCUSSION

The purpose of this study was to model the relationships between anticipated review method, accountability, and audit performance. Auditing research emphasizes the role of accountability in auditing but typically does not incorporate it into a comprehensive model of auditor behavior. We examine the three methods of audit workpaper review commonly used in the current audit environment--interviews, discussion, and electronic. Previous studies of workpaper review have only examined two methods at a time and have found mixed results as to the most effective method of review. We measure accountability to determine if different review methods result in greater feelings of accountability. We also extend Brazel et al. (2004) by examining a different type of preparer task and by explicitly examining how accountability differences affect cognitive processing and audit performance. We use both mechanical error detection and solution of conceptual errors as performance measures to test whether accountability effects are different for different types of performance.

We find support for our model with significant links between review method, accountability, and our performance measures. On average, participating auditors exhibited relatively high accountability under all three review methods. In our comparison of review methods, electronic review produces greater accountability than interviews, but accountability under discussion is not significantly different from either of the newer methods of review. This result is in contrast to Brazel et al. (2004) who find accountability is greater when written comments are discussed versus emailed. We find no significant difference between these two methods of review in our study. This difference in results is likely due to differences in tasks. The Brazel et al. (2004) task involved making and documenting a going concern judgment, whereas our auditors performed a typical audit evidence evaluation task related to accounts receivable (proper aging, cutoff issues, proper recording of revenue, etc.). Verbal communication should increase accountability in Brazel et al. (2004) because auditors have to justify the judgments they made during discussion with the reviewer. Our task, on the other hand, required more documentation of actual audit procedures, which provides opportunity for more written review notes. The anticipation of written notes and the reduced opportunity for explanation in this situation likely engendered greater feelings of accountability for our auditors.

The direct effect of interview on conceptual error performance is, however, consistent with the results of Brazel et al. (2004) and indicates that the type of task is an important factor in determining method of review. Analyzing and resolving our conceptual issues are qualitatively similar to the analysis of going concern required by Brazel et al. (2004). These results are also consistent with Payne et al. (2010) who

show interviews lead to a greater focus on conceptual parts of the audit program than electronic reviews. Additional research is needed to gain a better understanding of the type of communication that creates the greatest level of accountability for various audit tasks.

Our additional analyses aimed at determining the role of cognitive processing in accountability's link to performance show accountability is positively associated with time spent on the audit task but not significantly associated with the amount of audit evidence examined, although an indirect relationship between accountability and evidence does exist. However, even with cognitive processing measures in the model, accountability still has a direct effect on detection of mechanical errors. Our additional analyses also show that accountability has an indirect effect on detection of mechanical errors and solving conceptual errors. Furthermore, the results reveal an interesting relationship between the cognitive processing measures and documentation. The amount of time spent on the task has a positive effect on the amount of evidence examined and the amount of documentation. However, the amount of evidence examined has a negative effect on the amount of documentation. These results are consistent with a time constraint tradeoff; examining more evidence leaves less budget time to document the findings.

Our results have implications for practice. Results show that auditors will alter how they perform audit procedures in response to an anticipated review. Their response is influenced both by the intensity of accountability and also the focus of the review. In particular, the interview method is associated with a relatively lower level of accountability but a greater focus on conceptual errors than electronic review. Agoglia

et al. (2010) find reviewers will choose electronic reviews when risk of misstatement is low and add discussion when risk is higher. That is, rather than a fixed approach to review, reviewers alter their review according to particular circumstances of the audit. Our results support such a strategy and suggest, for example, an electronic review is especially appropriate for audit steps where documentation and mechanical errors are issues. In contrast, an interview may be especially appropriate where conceptual errors and timeliness are of concern. However, it is important that reviewers communicate their intended review method to subordinates early in the audit as our results are based on auditors' anticipated review.

Table 1: Summary of Prior Studies of Audit Review Methods

| Prior Study | Review Methods Compared | Findings |
|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ismail and Trotman (1995) | Review made after auditor's judgment is formed; either with or without discussion | Review groups with discussion generated more plausible hypotheses |
| Favere-Marchesi (2006) | Concurrent review discussions (face-to-face discussions take place at the same time as the review of the working papers) and Post-review discussions (face-to-face discussions are held following review of the working papers) | Post-review discussions resulted in generating a greater number of plausible hypotheses |
| Miller, Fedor and Ramsay (2006) | Amount of discussion of written notes | Discussion of written review notes enhances all preparers' motivation to improve performance and resulted in better performance for less experienced auditors but diminished performance for more experienced auditors |
| Brazel, Agoglia and Hatfield (2004) | Face-to-face review in which preparers meet with reviewers and discuss review notes in person, and electronic review in which review notes are emailed to preparers, allowing preparers more time to formulate their initial responses | Preparers anticipating a face-to-face review are more concerned with audit effectiveness, produce higher quality judgments, are less efficient at their task, are less likely to be influenced by prior year workpapers, and feel more accountable than preparers in both the electronic review and no-review conditions |
| Payne, Ramsay & Bamber (2010) | Interview and written review with no discussion | Review-by-interview has the potential to enhance audit effectiveness by encouraging auditors' efforts towards more cognitively demanding, conclusion-oriented audit procedures |
| Agoglia, Hatfield and Brazel (2009) | Face-to-face and electronic | Relative to face-to-face review, the quality of reviewers' going concern judgments was significantly lower when their workpaper preparers anticipated an electronic review; review format influences documentation quality (reviewers typically do not detect quality issues) |
| Agoglia, Brazel, Hatfield and Jackson (2010) | Face-to-face and electronic | Reviewers choose electronic (face-to-face) review method when misstatement risk is low (high) and when workload pressure is high (low). When misstatement risk is high, the effect of workload pressure on choice of review method is reduced |

Table 2: Aspects of Review, the Presence of Each in Different Methods of Review, and the Effect of Each on Preparer’s Accountability (+/-)

| Aspects of Review: | METHOD OF REVIEW | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-------------------------------------------|---------------------------------------------|
| | Interview | Written Review with Subsequent Discussion | Electronic Review (e-mail written comments) |
| Common to All Methods: | | | |
| Presence of another, Identifiability, Reason-Giving, Evaluation (Lerner and Tetlock 1999) | Yes (+) | Yes (+) | Yes (+) |
| Unknown views, Accuracy, Processes, Well-informed, Legitimacy (Lerner and Tetlock 1999) | Yes (+) | Yes (+) | Yes (+) |
| Justification Required and Feedback Provided (DeZoort et al. 2006) | Yes (+) | Yes (+) | Yes (+) |
| Vary Depending Upon Method: | | | |
| Immediate responses to review comments required | Yes (+) | Yes (+) | No (-) |
| Potential to be asked for additional justification during face-to-face interaction beyond what would be typically asked for in review of a workpaper (Brazel et al. 2004) | Yes (+) | Yes (+) | No (-) |
| Structured review with little opportunity for preparer to change the course of the review (practitioner interviews) | No (-) | Yes (+) | Yes (+) |
| Opportunity for additional justification or explanation prior to reviewer’s opinion being formed (Favere-Marchesi 2006) | Yes (-) | No (+) | No (+) |
| Outcome of the review (notes) typically visible to others on the engagement team (practitioner interviews) | No (-) | Yes (+) | Yes (+) |
| Softer (nicer) review due to face-to-face interaction (e.g. Waung and Highhouse 1997) | Yes (-) | Yes (-) | No (+) |

Table 3: List of Embedded Errors

Conceptual Errors

1. Inventory supply arrangement; sales recorded prematurely on unfinished inventory
2. Sale to retailer with right of return for unsold products
3. Bill and Hold sales transaction

Mechanical Errors

1. Cut-off error
 2. Invoice in wrong column on aging schedule
 3. Quantity x Price extension error on invoice
 4. Invoice in wrong column on aging schedule
 5. Bill of lading not signed by carrier
 6. Full sale recorded but only partial shipment
 7. Bill of lading not signed by carrier
 8. Invoice dated before shipping
 9. Purchase order date 3 months before shipping
 10. Invoice dated before shipping
 11. Invoice dated before shipping
 12. Purchase order date 3 months before shipping
 13. Invoice dated before shipping
 14. Invoice date wrong on aging schedule
-

Table 4: Demographic Variables by Method of Review - Means (Standard Deviations)

| Description | Method of Review | | | |
|---------------------------------------------------------------------------|------------------|----------------|----------------|----------------|
| | TOTAL [n=120] | INT [n=39] | DISC [n=44] | ELEC [n=37] |
| Age in years | 26.4 (3.2) | 26.0 (2.0) | 26.5 (2.9) | 26.5 (4.3) |
| Gender (0=female, 1=male) | .52 (.50) | .50 (.51) | .43 (.50) | .59 (.50) |
| Number of times accounts receivable testing had been performed previously | 4.8 (5.9) | 3.6 (4.2) | 5.2 (6.2) | 5.4 (7.2) |
| Audit experience in months | 33.9 (27.1) | 31.9 (19.6) | 33.2 (20.8) | 36.4 (41.9) |
| Position in the firm (0=other, 1=assist., 2=senior, 3=supervising senior) | 1.8 (.9) | 1.8 (.9) | 1.8 (1.0) | 1.6 (.8) |
| Prior experience receiving written review with follow-up discussion | .46 (.22) | .44 (.24) | .49 (.19) | .44 (.25) |
| Prior experience receiving interviews | .27 (.18) | .27 (.20) | .27 (.14) | .27 (.21) |
| Prior experience receiving written review with comments sent via e-mail | .27 (.23) | .29 (.22) | .24 (.19) | .29 (.29) |

Table 5: Descriptive Statistics

| Variable | Description | Possible Range | Actual Range | Mean (Std.Dev.) | By Review Group: | | |
|----------|------------------------------------------------------------------------|----------------|--------------|-----------------|-------------------------|------------------------|-------------------------|
| | | | | | INT Mean (Std.Dev.) | DISC Mean (Std.Dev.) | ELEC Mean (Std.Dev.) |
| ACCT | Sum of accountability questions | 0-35 | 10-35 | 24.4 (5.4) | 22.9 ^b (5.9) | 24.6 (5.4) | 25.8 ^b (4.5) |
| TIME | Total time (in minutes) to complete the audit task | n/a | 7-268 | 57.6 (38.5) | 53.8 (33.6) | 58.7 (48.0) | 60.4 (30.6) |
| EVID | Total number of documents viewed while completing the audit task | n/a | 5-203 | 81.9 (28.5) | 81.6 (27.7) | 80.1 (32.9) | 84.2 (23.9) |
| DOC | Square root of the total number of words documented on audit workpaper | n/a | 5.6-26.2 | 15.6 (4.2) | 14.9 (4.3) | 15.8 (4.1) | 16.1 (4.2) |
| CONC | Sum of conceptual errors coded 2 | 0-3 | 0-3 | 1.3 (1.0) | 1.5 ^a (1.0) | 1.1 ^a (1.1) | 1.3 (.9) |
| MECH | Sum of coding scores for mechanical errors | 0-28 | 1-22 | 8.3 (4.0) | 7.6 (3.6) | 8.3 (3.6) | 9.0 (4.7) |

Legend:

- INT = Interview
- DISC = Written review with follow-up discussion
- ELEC = Written review with comments sent via e-mail
- ACCT = Sum of accountability questions (range 0-35)
- TIME = Total time (in minutes) to complete the audit task
- EVID = Total number of documents viewed while completing the audit task
- DOC = Square root of the total number of words documented on audit workpaper
- CONC = Sum of conceptual errors coded 2 (range 0-3)
- MECH = Sum of coding scores for mechanical errors (range 0-28)

Significance (2-tailed):

- ^a INT/DISC, p<.10
- ^b INT/ELEC, p<.05

Figure 1: Theoretical Framework

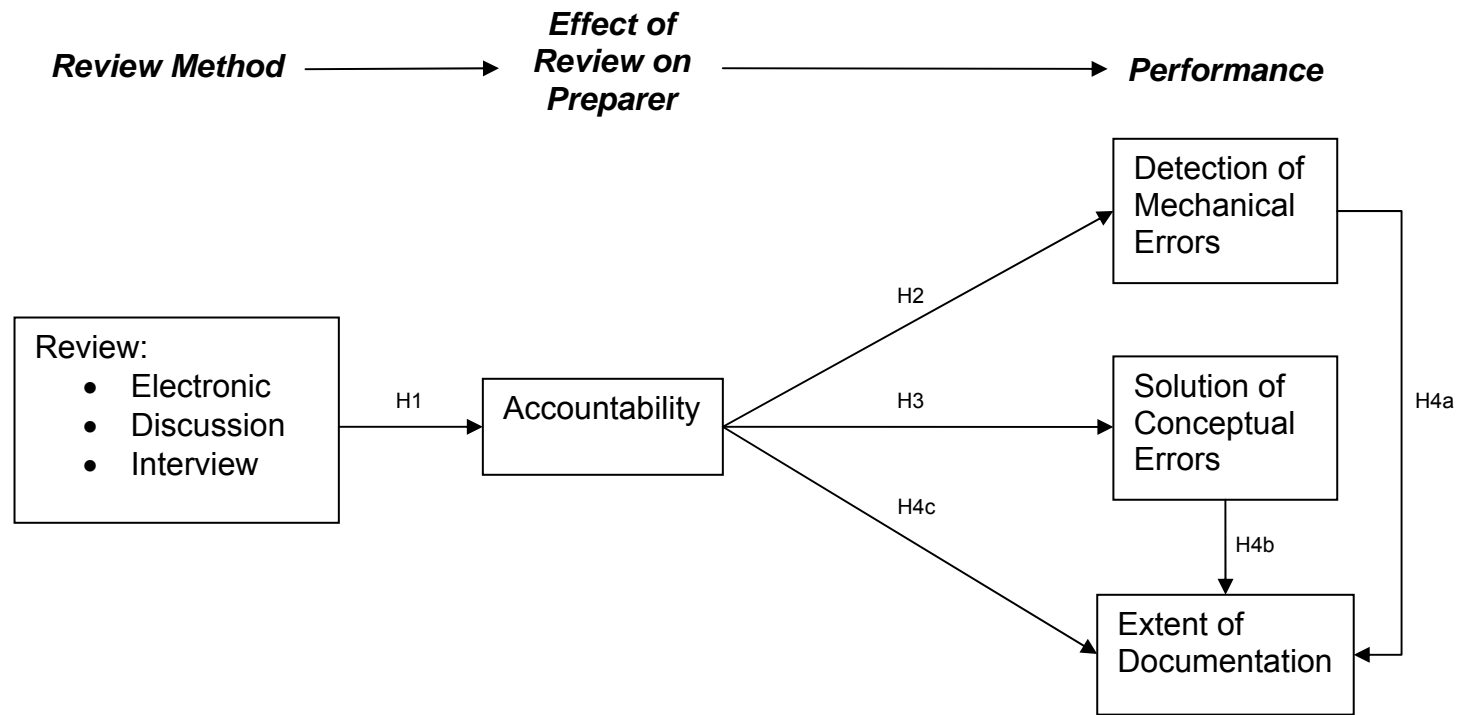
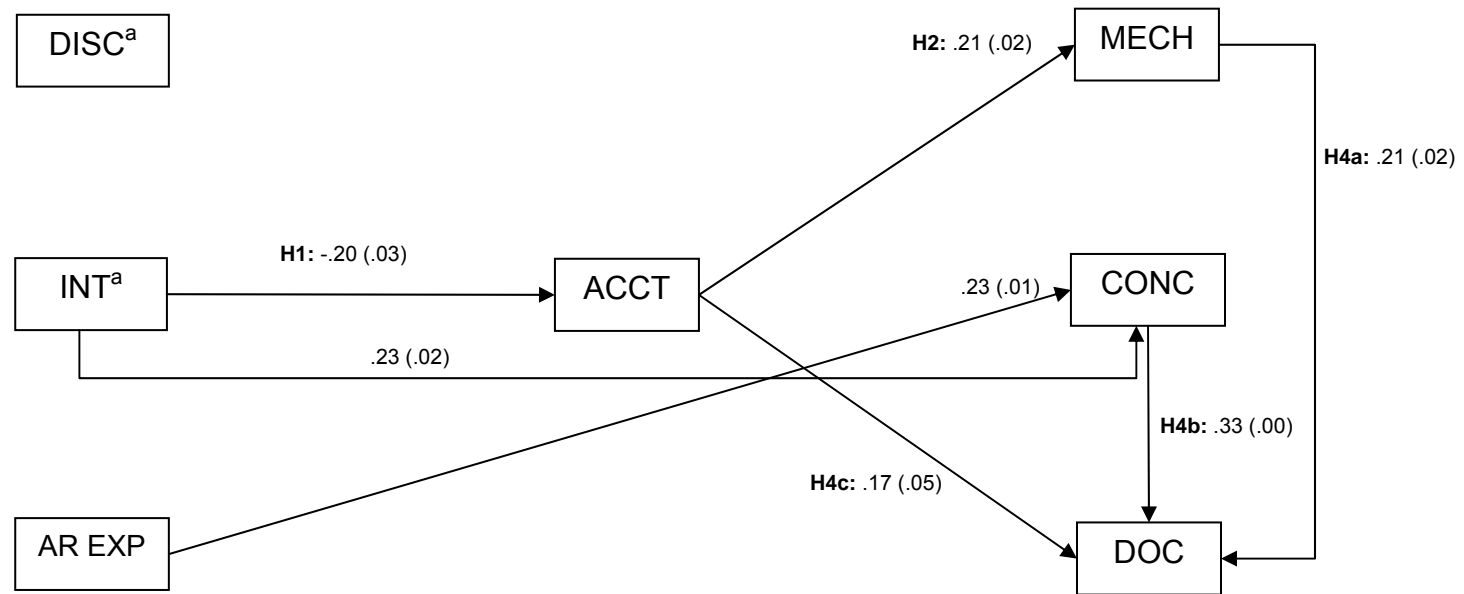


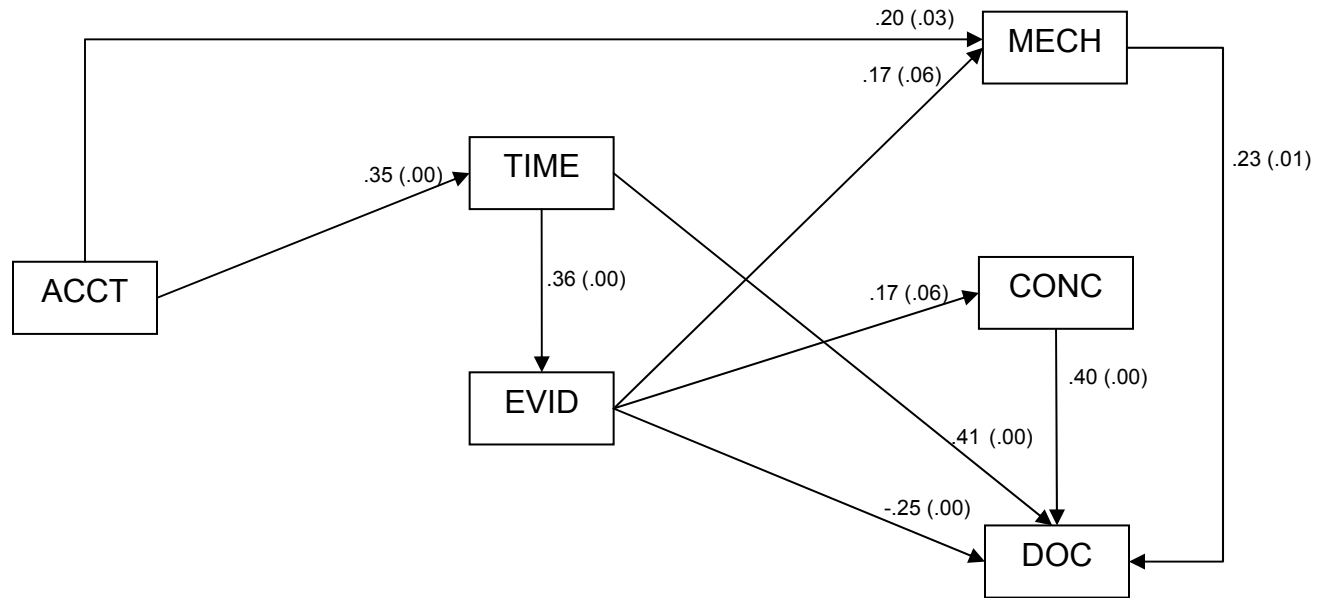
Figure 2: Results of Path Analysis – Path Coefficients (p-values, two-tailed)



Legend:

- ^aCompared to Electronic Review
- DISC = Dummy variable coded 1 for Discussion review, 0 otherwise)
- INT = Dummy variable coded 1 for Interview review, 0 otherwise)
- AR EXP = Number of times accounts receivable testing had been performed previously
- ACCT = Sum of accountability questions (range 0-35)
- MECH = Sum of coding scores for mechanical errors (range 0-28)
- CONC = Sum of conceptual errors coded 2 (range 0-3)
- DOC = Square root of the total number of words documented on audit workpaper

Figure 3: Partial* Results of Path Analysis Including Cognitive Processing Variables – Path Coefficients (p-values, two-tailed)



Legend:

- * For ease of illustration, only paths originating with ACCT are shown. However, all variables were included in the path model shown in Figure 3 above. Variables included but not illustrated are DISC, INT, and AR EXP (see Figure 2 legend)
- ACCT = Sum of accountability questions (range 0-35)
- TIME = Total time (in minutes) to complete the audit task
- EVID = Total number of documents viewed while completing the audit task
- MECH = Sum of coding scores for mechanical errors (range 0-28)
- CONC = Sum of conceptual errors coded 2 (range 0-3)
- DOC = Square root of the total number of words documented on audit workpaper

APPENDIX

Instructions and Audit Program

You have been assigned as the in-charge auditor for the BelowShield audit for the year ended 12/31/05. Assume that today is February 20, 2006 and this is your first day of field work. Prior to today an assistant accountant, Lisa Dillon has been in the field and she has performed some follow-up work for the confirmations. Your time budget for preparing the workpapers is 30 minutes. However, as is true in practice, you may spend as much or as little time preparing the workpapers as you believe is necessary.

For all workpapers, please provide your comments, issues for follow-up, and define any tickmarks that have been used. **Access the module on the USB flash drive now.**

Audit Program (complete the following procedures):

1. For the following (10 companies):

| | |
|-------------------------------|---------------------------|
| Active Sports | American Eagle Outfitters |
| Cincinnati Bengals | Foot Locker |
| Gold's Gym | Northstar Pro Shop |
| Pacific Sunwear of California | Tag Sportswear |
| Target | Wal-Mart |

Note: It is most efficient to click on one of the companies and perform all steps at the same time.

- a. **Agree to the confirmation if received**

- i. All confirmations where an issue is noted by the customer have already been investigated and notes made by the assistant auditor, Lisa Dillon. To review her notes click on the 'Show Asst. Auditor Notes' button on the flash drive module.

- b. For all companies, **perform the following procedures:**

- i. Apply subsequent cash receipts.
- ii. Determine accuracy of aging by examining the invoice date and bill of lading date.
- iii. Test for existence by examining invoice, bill of lading, and purchase order.

If you discover errors, please describe the problem as specifically as possible on the workpaper. Include your opinion about whether the account is properly recorded.

After you have completed all the steps on the audit program, please **click the "Go To Survey" button** in order to complete your task.

| ACCOUNTS RECEIVABLE AGING SCHEDULE 12/31/05 | | | | | | | | Audit Work (add amounts and tickmarks) | | | | |
|---------------------------------------------|-------------------|--------------|-------------------|------------------|-------------|------------------|------------------|----------------------------------------|-------------------|------------|-----|----|
| Company | Invoice Amount | Invoice Date | 0 to 30 | 30 to 60 | 60 to 90 | 90 to 120 | > 120 | Conf. Amount | Subs. Cash Amount | Agreed to: | | |
| | | | | | | | | | | Inv | BOL | PO |
| Active Sports | 15,000.00 | 12/03/05 | 15,000.00 | | | | | | | | | |
| Akron Country Club | 11,111.00 | 12/31/05 | 11,111.00 | | | | | | | | | |
| All Star Sporting Goods | 200.00 | 11/30/05 | | 200.00 | | | | | | | | |
| American Eagle Outfitters | 2,599.50 | 11/06/05 | | 2,599.50 | | | | | | | | |
| Cincinnati Bengals | 19,995.00 | 10/06/05 | | 19,995.00 | | | | | | | | |
| Columbus Blue Jackets | 960.00 | 12/06/05 | 960.00 | | | | | | | | | |
| Dicks Sporting Goods | 26,000.00 | 12/01/04 | | | | | 26,000.00 | | | | | |
| Foot Locker | 3,501.00 | 11/05/05 | | 3,501.00 | | | | | | | | |
| Gold's Gym | 9,000.00 | 12/06/05 | 9,000.00 | | | | | | | | | |
| Jeff's Golf Gear | 2,705.00 | 12/31/05 | 2,705.00 | | | | | | | | | |
| Northstar Pro Shop | 10,000.00 | 12/15/05 | 10,000.00 | | | | | | | | | |
| Old Navy | 400.00 | 09/05/05 | | | | 400.00 | | | | | | |
| Pacific Sunwear of California | 799.92 | 12/04/05 | 799.92 | | | | | | | | | |
| Pro Sports Management | 5,431.00 | 12/02/05 | 5,431.00 | | | | | | | | | |
| Tag Sportswear | 1,500.00 | 12/30/05 | 1,500.00 | | | | | | | | | |
| Target | 50,000.00 | 09/06/05 | | | | 50,000.00 | | | | | | |
| The Gap | 6,307.00 | 11/07/05 | | 6,307.00 | | | | | | | | |
| U.S. Coast Guard | 9,846.00 | 12/13/04 | | | | | 9,846.00 | | | | | |
| University of Kentucky | 25,000.00 | 11/05/05 | | 25,000.00 | | | | | | | | |
| Wal-Mart | 111,000.00 | 12/02/05 | 111,000.00 | | | | | | | | | |
| TOTALS | 311,355.42 | | 167,506.92 | 57,607.50 | 0.00 | 50,400.00 | 35,846.00 | | | | | |

Tickmark Explanations and Comments (use next page for extra space):

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