The Incremental Benefits of a Forensic Accounting Course on Skepticism and Fraud-Related Judgments

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ABSTRACT

This study examines the extent to which providing a course that emphasizes forensic accounting influences students skepticism and fraud-related judgments. We follow a cohort of students (trained students) who have enrolled in a forensic accounting course and examine their fraud judgments at various points in time—the first day of instruction, the last day of instruction, and seven months later. We compare these fraud judgments to a control group of students who have completed a typical audit sequence (untrained students) and to a panel of fraud experts. We find that when confronted with a non-conforming account, trained students provide significantly higher initial risk assessments post-training 1) than they did pre-training and 2) than did the untrained students. This suggests that the specialized course may lead to increased skepticism. We also find, in general, that post-training students assigned somewhat higher relevancy ratings to fraud risk factors than did a panel of experts; while the untrained students ascribed significantly less relevance than the experts did to these same facts. In addition, after exposure to fraud risk factors, trained students provided higher revised risk assessments post-training than they did pre-training. Finally, we find that seven months after the course, the trained students' performance is sustained, suggesting that the effects produced by taking a fraud-specific forensic accounting course persist.

Keywords: Risk Assessment, Fraud, Training, Skepticism, Fraud-Related Judgments, Persistence of Training Effects

Data Availability: Available upon request

INTRODUCTION

Most large universities offer accounting students a two-course audit series. However, the increased emphasis by the accounting profession on fraud training has led some universities to adopt a third course in the audit series that specializes in forensic accounting. The purpose of this paper is to examine the incremental benefit of such a course on students' ability to detect fraud. More specifically, we examine whether the forensic accounting course raises the students' level of skepticism as well as affects their ability to make risk assessments and judge the relevancy of fraud risk factors. We study this by comparing the fraud-related judgments of two groups of students to a panel of experts. One group of students has completed a typical two-course audit sequence; the second group has completed the same two-course sequence as well as a specialized forensic accounting course.

This investigation is important for several reasons. First, detecting fraud has become a high priority in the accounting profession (PCAOB 2004; Elliott 2002) and if the typical audit series is not providing future auditors with the skills and characteristics necessary for today's work environment, it is important to know if adding a forensic accounting course will bring future auditors closer to the level of skill demanded. One auditor characteristic deemed important to fraud detection is professional skepticism. For example, the Public Company Accounting Oversight Board (PCAOB), in its auditor inspections, cited the lack of professional skepticism as a serious problem in auditors' fraud investigations (PCAOB 2007). In addition, Statement on Auditing Standards (SAS No. 99), *Consideration of Fraud in a Financial Statement Audit*, has reemphasized the

need for auditors to exercise professional skepticism when considering the risk of material misstatement due to fraud, suggesting that increased skepticism should lead to improved risk assessments (AICPA 2002). Standard setters have suggested that training can help auditors to improve these fraud judgments.[1] Second, almost 60% of Securities and Exchange Commission (SEC) enforcement actions against auditors between 1987 and 1997 were directly related to the failure of auditor professional skepticism (Beasley et al. 1999). While it appears that regulators consider increased skepticism critical to detecting fraud, little is known about how to "increase" it. The assumption of regulators and educators seems to be that training will raise skepticism thereby, improving fraud-related judgments. However, whether this is true remains an empirical question. Thus, this investigation is important to standard setters and auditors. Third, Nieschwietz et al. (2000) in their review of fraud literature suggest that training may help with fraud detection, but point out that there is virtually no research in this area. Our study relates training in fraud-risk factors to risk assessments and thus, contributes to this literature by providing information that helps researchers understand how training affects fraud-risk-factor evaluations and risk assessments.[2] Fourth, providing a specialized audit course that emphasizes forensic accounting skills is costly in terms of time and effort. Thus, it is important to know whether this additional specialized training (beyond a typical audit

[1]In an effort to encourage such training, the AICPA recently issued a call for the development of real world based cases that address fraudulent financial reporting, asset misappropriation and strategies for detecting fraud (AICPA 2003). Information on case submission can be found at http://www.aicpa.org/members/div/career/edu/ppcdp.htm.

[2] Prior fraud research has documented evidence related to fraud risk evaluations (e.g., Hackenbrack 1992; Hoffman and Patton 1997; Glover 1997) and fraud risk assessments (e.g., Knapp and Knapp 2001; Carpenter 2007); our study documents how training affects the combination.

sequence) helps to successfully prepare students to a level required by the current audit environment. If specific training in forensic accounting is effective in raising students' levels of skepticism, and this level persists over time, schools may wish to include such courses in their curriculum and practitioners and firms might place a premium on students trained with this type of course. Thus, our study provides a contribution to practice.

In this paper, we examine four research questions. First, does providing a specialized course in forensic accounting course raise students' skepticism over and above a typical auditing sequence? Second, do students who have completed a forensic accounting course more accurately (as benchmarked by experts) assess the relevance of fraud risk factors than students who have completed a typical audit sequence? Third, do students who have completed a forensic accounting course more appropriately incorporate fraud risk factors into a risk assessment than students who have completed a typical audit sequence? Fourth, to what extent do these effects persist over time?

To examine these issues, we run a longitudinal study on a cohort of thirty-seven Masters in Accounting (MAcc) students who during the course of this study completed an audit course that emphasizes forensic accounting tools.[3] These students are asked to complete a short case at three points in time: (1) the first day of class before any material is covered (denoted pre-training); (2) the last day of class (denoted post-training); and (3) seven months after completing the course (denoted follow-up). All students in the cohort

[3] The auditing course in which the students participated was entitled "Forensic Accounting" and was a semester-long course that included lectures, student presentations and case studies. One case study was a problem-based learning exercise (Durtschi 2003). Problem-based learning advocates claim knowledge gained during the execution of these cases persists over time (Norman and Schmidt 1992).

have completed a typical auditing series, consisting of two audit classes, prior to attending the forensic accounting course. The case completed by the students consists of a short description of a company, the company's financial statements, and a statement that highlights bad debt expense as a non-conforming account. We collect three dependent variables. First, we estimate the students' level of skepticism by asking them to provide their initial risk assessment after they read the introductory materials. Next, we give them a list of fifteen additional facts (many of which are common "red-flags" of fraud) and tell them that these facts came to light during their audit. We ask students to rate the relevance of each fact. Finally, students are asked to provide a final risk assessment. We compare the final risk assessment to their initial risk assessment to determine whether the additional facts influenced them to revise their initial judgment.

To examine the incremental effect of the forensic accounting course on students' skepticism and fraud related judgments we compare (1) the pre-training results (i.e., collected on the first day of class) to (2) the post-training results (i.e., collected on the last day of class).[4] To examine the persistence of the training effects, we compare the post-training results to the follow-up results (i.e., the results collected seven months after the course). In addition, we compare the results from both the trained and untrained students

[4] Because these students have self-selected into the forensic accounting course (and are MAcc students), we also compare their results to students who have completed a typical auditing sequence to determine whether 1) merely being enrolled in a forensic accounting course raises a student's level of skepticism and 2) whether MAcc students perform differently on these tasks by virtue of being, on average, better students. As discussed in the results section, we find no difference in the judgments between these groups.

to the results of a panel of fraud experts.[5] The panel of experts serves as a benchmark for skepticism so we can determine the appropriateness of the students' level of skepticism.

We find that, post-training, students provide a significantly higher *initial* and *revised* risk assessment than both the untrained students and themselves pre-training. This implies that a forensic accounting course may lead to an increased level of initial skepticism. We also find, in general, that when students evaluate a series of fraud risk factors (i.e., red flags), students post-training often rate these factors as significantly more relevant than did a panel of experts; however, untrained students generally rate these same factors as less relevant than did the experts. Further, when asked to provide a second (revised) risk assessment after reviewing the fraud risk factors, the post-training students' revised risk assessments did not differ significantly from those of the experts. This suggests that subsequent to a course in forensic accounting, trained students appear to have an appropriate level of skepticism (as benchmarked by experts), minimizing the threat that training itself leads students to become overly skeptical, which in turn could threaten audit efficiency. Finally, we find that these effects persist over time. Specifically, we find that the fraud judgments (initial risk assessments, relevancy assessments of fraud risk factors, and revised risk assessments) collected in the follow-up questionnaire seven months after completing the course, were similar to the post-training fraud judgments collected immediately upon completing the course. These results suggest that specific forensic accounting training helps students retain facts and also

[5] The panel of experts consisted of five individuals. They included a partner at a regional audit firm specializing in fraud, two owners of forensic accounting firms, one forensic specialist at a Big 4 firm, and one law enforcement officer specializing in white collar crimes. The panel had a combined 99 years of experience.

affects students' abilities to use those facts to influence judgments long after the training is completed.

The remainder of this paper is organized as follows. The next section provides background and hypotheses development. The third section outlines the research method. The fourth and fifth sections provide the results and conclusions, respectively.

BACKGROUND AND HYPOTHESES DEVELOPMENT

Background

Because this study's focus is on whether a forensic accounting course raises students' skepticism and influences their fraud-related judgments, a question underlying this study is whether increasing skepticism, via a forensic accounting course, is in-and-of itself a worthwhile achievement? We argue that while a typical audit course sequence may introduce a student to past frauds as well as known red flags of fraud, it is possible that each of these achievements may have limited usefulness in detecting future frauds if students have not also been given a heightened sense of skepticism. Indeed, we posit that a key educational goal of a forensic accounting course may be to immerse students in situations that heighten their awareness of fraud, thereby increasing their skepticism so that they approach any audit situation with a more questioning mind.[6]

A higher level of skepticism may help auditors detect fraud because fraud is both firm and situation specific. Section 404 of the Sarbanes-Oxley Act (SOX) underscores this point by emphasizing internal controls. Perpetrators prey on a firm's particular

[6] A second essential part of a forensic accounting course should be teaching students to distinguish between an error and a fraud. The goal of such a course should not only be to raise student skepticism, but to temper a tendency to think every error is a fraud. This will allow students to be alert to anomalies which should trigger a search for additional clues that might indicate fraud rather than error.

weaknesses; therefore, SOX asks that each firm's specific weaknesses be discovered and alleviated. It is unreasonable to expect any audit course to prepare students for every situation they might encounter, thus a course that enables students to confront a variety of situations with a skeptical eye may prove valuable. In addition, research suggests that knowledge of "red-flags" of fraud or the use of typical decision aids which highlight risk factors, have little or no effect on risk assessments (e.g., Pincus 1989; Eining et al. 1997; Asare and Wright 2004). Thus, if knowledge of a list of red flags alone does not affect risk assessments, perhaps the combination of that knowledge with a raised level of skepticism will help auditors build a cognitive fraud model that will improve their ability to detect fraud (Johnson et al. 1993; Nieschwietz et al. 2000). We posit that increasing skepticism is a positive outcome because if auditors approach an audit with an increased level of skepticism (as required by SAS No. 99), and then encounter a red flag of fraud, this heightened state of skepticism should lead to a greater probability of detecting any fraud that is present.

Hypotheses Development

Successful fraud detection requires that individuals consider the possibility that fraud exists, conduct procedures to find it, and finally, draw the proper conclusion based on the evidence they acquire. To accomplish these objectives, auditing standards require that auditors, in the planning phase of the audit engagement, exercise professional skepticism such that they assess a sufficient initial likelihood of fraud. Then, auditors should recognize and weigh the relevance of any additional fraud risk factors they

encounter during the audit and continually revise their risk assessments (AICPA 2002, 2003).

Skepticism and Initial Risk Assessments

In the planning phase of an engagement, one should assess the risk of material misstatement at the assertion level and determine the procedures that are necessary based on that risk assessment (Messier et al. 2004). In this initial assessment, one should consider both the risks that are inherent in the environment (e.g., complexity of transactions) and those that are related to the control environment (e.g., segregation of duties). At this initial phase, early impressions are made about the client and, based on those impressions; auditors assess an initial likelihood that fraud exists in the financial statements.

SAS No. 99 emphasizes the importance of auditors exercising professional skepticism, particularly in this initial phase of the engagement. For example, SAS No. 99 requires auditors to establish a mindset that recognizes that a material misstatement due to fraud may be present, regardless of any past experience with the company and regardless of the auditors' beliefs about management's honesty and integrity (AICPA 2002). Standard setters suggest that reminding auditors about the possibility of fraud through training is one way that auditors might increase their professional skepticism, and thus, improve their risk assessments (AICPA 2003).

While, one would expect a course in forensic accounting would raise a student's level of skepticism, to our knowledge, no empirical evidence exists on the effects of academic courses and training on professional skepticism or initial risk assessments. In

the first hypothesis, we test whether a course in forensic accounting provides an incremental increase in skepticism over the typical audit sequence. If a course in forensic accounting leads to increased skepticism we would expect that when confronted with a non-conforming account *post-training,* students would have higher initial risk assessments than those who have received no training. Thus, we test the following hypothesis:

HYPOTHESIS 1. Post-training students will have higher initial risk assessments than students who have not received training.

Evaluation of Fraud Risk Factors

The most basic purpose of fraud training is to build a foundation from which participants may consider how and where the financial statements might be susceptible to fraud by acquiring knowledge of a set of fraud risk factors. In fact, standard setters recommend that forensic audit procedures specifically designed to identify risk factors be performed during the audit (PCAOB 2004). Despite this, the Public Oversight Board (POB) reported that auditors often overlook obvious risk factors and fail to follow up on exceptions, which results in frauds going undetected (POB 2000, 224).

Researchers have questioned the value of simply knowing a set of red-flags on fraud detection. For example, Wilks and Zimbelman (2004) suggest that training auditors to evaluate fraud risk cues with typical instructional devices (e.g., checklists, client questionnaires, etc.) may not be effective because these devices fail to engage the auditors in deeper, more strategic reasoning. Pincus (1989) suggests that red flags are not actually diagnostic and, conversely, are more likely to mislead the auditor. As stated above, this may be the case because red-flag lists are created retrospectively and may not

apply to situations different than their original setting. Thus, to determine the extent to which a forensic accounting course has taught students how to identify (relevant) red-flags for a given situation may require comparing trained students (and those who have not received training) to a panel of experts. If trained students assign a level of relevance similar to that of a panel of experts, we can conclude that training provides improved performance in the application of these fraud risk factors. We expect that a course that focuses on forensic accounting should result in students with better fraud risk factor evaluation skills than those students in a typical audit sequence. Thus, post-training students should be better able to accurately assess the relevance of fraud risk factors than those who have not received this training.[7] Therefore, we propose the following hypothesis:

HYPOTHESIS 2. Post-training students will more accurately (as benchmarked by experts) assess the relevance of fraud risk factors than students who have not received training.

Revised Risk Assessments

After evaluation of fraud risk factors, a skeptical individual must accurately synthesize these factors and revise their risk assessment accordingly so that appropriate audit procedures are planned and performed (AICPA 2003). Prior research has shown that auditors have difficulty with this synthesis. For example, Hackenbrack (1992) finds that auditors overweight non-diagnostic evidence in their risk assessments and Hoffman and Patton (1997) find that accountability (i.e., holding auditors accountable to their

[7] There exists the possibility that training makes students overly-skeptical, believing red flags to always be extremely relevant while experts understand better that the red flags of fraud may apply in some, but not all situations. Thus, we will examine in additional analyses if post-training students consistently assign a level of relevance higher than the experts.

superiors) increases auditors' risk assessments, but does not mitigate the fact that they overweight irrelevant factors. As an extension, Glover (1997) finds that when auditors are faced with time pressure, the negative effect of non-diagnostic evidence on auditors' risk assessments is lower, but still persists. Further, both Knapp and Knapp (2001) and Carpenter (2007) find that while managers are effective at assessing the risk of fraud (i.e., as higher when fraud is present than when it is not), lower level auditors struggle with risk assessments. To our knowledge, there has been no empirical evidence on how trained students evaluate relevant fraud risk factors, or synthesize the factors into a revision of their initial risk assessment.

We would expect that taking a course in forensic accounting would lead to increased skepticism and thus differences in how fraud risk factors are processed and synthesized into revised risk assessments. Specifically, we expect that post-training students, because of their increased skepticism, will revise their initial risk assessment if they find the fraud risk factors relevant. As such, they will have higher revised risk assessments than those who have not been trained. Thus, we provide the following hypothesis, stated formally:

HYPOTHESIS 3. Post-training students will provide higher revised risk assessments than students who have not received training.

Persistence of These Effects

Standard setters suggest that an auditor's professional skepticism can be dulled over time (AICPA 2003). Therefore, if a forensic accounting course raises an individual's level of skepticism and improves their fraud judgments, it is important that these judgments are sustainable over time. To examine the persistence of the training effects,

students must be tested again when some time has passed. We posit that a semester-long course that focuses on fraud cases will have enough impact that any increase in an individual's skepticism will persist.[8] Therefore, we expect that when participants are examined several months after their training, the three fraud judgments tested at the completion of their course (initial risk assessment, relevance ratings of fraud risk factors and revised risk assessments) will not be significantly different. Thus, we provide the following hypothesis, stated formally:

HYPOTHESIS 4. Follow-up testing of students who took the forensic accounting course will show initial risk assessments, fraud-risk factor evaluations, and revised risk assessments that are not different from their judgments provided post-training.

RESEARCH METHOD

We examine the effects of a course in forensic accounting on students' skepticism and fraud judgments. Specifically, we examine the pre-training, post-training and follow-up judgments of trained students and compare them to each other as well as to a control group of students not enrolled in the course and to a panel of experts. Data were collected via a case-based questionnaire.

Participants

Seventy-two accounting students from two large state universities participated in the study. There were 37 students (denoted trained students) who were enrolled in a

[8] The training received by the trained students was a semester-long course which included a problem-based learning case (see Durtschi 2003). Evidence in the medical field suggests that students who have taken such courses have increased knowledge retention (Barrows and Tamblyn 1980; Blumberg and Michael 1991; Norman and Schmidt 1992). However, since we do not examine a forensic accounting course which is identical with the exception of that case, we cannot determine the effect of that case specifically on the persistence of skepticism. See Durtschi and Fullerton (2005) for a discussion of the method used in the forensic accounting course examined.

university-provided forensic accounting course and a control group of 32 students (denoted untrained students) who had completed a typical auditing sequence, but had not enrolled in a forensic accounting course.[9] None of the students in either group had any real-world audit experience and all were enrolled in comparable courses (e.g., upper division undergraduate / graduate accounting courses). The students who were enrolled in the forensic accounting course were given the case-based questionnaire on the first day of class (pre-training), and again on the last day of class (post-training). Seven months after the last day of class, we again mailed the questionnaire to these same students (follow-up). Seventeen of the 37 students in the course responded and completed the follow-up questionnaire.

Case Materials and Dependent Measures

The case materials had three parts: an initial risk assessment, a fraud risk factor evaluation, and a revised (i.e., final) risk assessment. Participants took approximately 45 minutes to complete all three parts.

In Part I, participants were asked to assume the role of auditors while reading information and answering questions about a wholesale office supply company. The case materials included background information about the company and the company financial statements.[10] The case also included a statement indicating that the bad debt expense

[9] One student did not complete the instrument at the end of the course. Thus, we have 36 post-training students. To ensure the students had completed a *typical* audit sequence, the instructor of the second course was not asked until the last day of class to run the case-based questionnaire and nothing was said to instructors of the first course.

[10] The financial statements in this case were adapted from Lindberg (1999).

account was unusually high or unusually low.[11] Based on the background information provided, the financial statements, and this single statement calling their attention to a nonconforming account, participants were asked to assess the likelihood that there was an intentional misstatement using an 11-point Likert scale with the endpoints labeled "not at all likely" and "extremely likely."[12]

Part II informed the participants that some additional facts came to their attention during their audit of the firm. These were a set of 15 facts which were selected to load into three factors, and the facts satisfactorily loaded in excess of .50 (Nunnally 1978): 1) individual-level pressures on persons with "opportunity to commit fraud" (average factor loading .656), 2) firm-level pressures related to the "economic environment" (average factor loading .643), and 3) answers to "common accounting questions" an accountant would normally ask when confronted with a non-conforming bad-debt expense account (average factor loading .554).[13] The facts provided were indicative of fraud risk factors as outlined in SAS No. 99, though their level of relevance to this particular case varied.[14] Participants were asked to assess a level of relevance for each fact on an eleven-point scale with endpoints labeled "not at all relevant" and "extremely relevant."

[11] Two versions of the experiment were randomly assigned to control for any effects that might be due to the direction of the potential misstatement. No differences were predicted between these two groups a priori and there were no statistical differences noted during data analysis.

[12] Participants were also asked to assess the likelihood of error (labeled an unintentional misstatement) using a similar scale. Because our focus was on participants' fraud judgments, this question was included so that participants were not sensitized to only the possibility of fraud.

[13] These facts were subjected to Rotated-Varimax factor analysis and loaded, as expected, into the three categories.

[14] To control for order effects, the order of these 15 facts was randomly varied such that three versions of the experiment were used. No statistical differences were noted during data analysis between the three versions.

In Part III, participants were asked for a second, *revised* risk assessment. Each participant provided an assessment of the likelihood that there was an intentional misstatement in the financial statements on an eleven-point scale from 0 for "not at all likely" to 10 for "extremely likely." The purpose of the second risk assessment was to evaluate how the participants had processed the additional facts provided in Part II into their revised risk assessment (i.e., whether the red-flags encountered during the audit caused them to raise their risk assessment).

RESULTS

Hypotheses 1 through 3 examine whether individuals who have received a course that focuses on forensic accounting have different fraud judgments than students who have completed a traditional two-course audit sequence. To test these hypotheses, we first compare the results from students who have completed a traditional audit course series (*untrained*) to students who are enrolled in a forensic accounting class on the first day of class prior to receiving any instruction (*pre-training*). We do this test because the forensic accounting class is a master's level course and the students who had completed the two audit courses were senior undergraduate students. Because of this, it is possible that (1) students who self-select into the forensic accounting class differ from students who did not elect to take the course, (2) the act of taking a pre-test in the forensic accounting course may make a difference in student expectations, and 3) it is possible that since only the top accounting students are admitted into the MAcc program, they might perform better on some tasks than the typical senior student in accounting. Next, we compare the results of students on the first day of class (*pre-training*) to their results

on the last day of class (*post-training*). We collect and report the assessments of these groups to assess the incremental impact of the forensic accounting course, over and above the typical audit sequence on students' skepticism and fraud judgments.

Results of Hypothesis 1 are displayed in Table 1. First, we compare the initial risk assessments of students who had just completed a typical audit course series (untrained students) with students on their first day in the forensic accounting course (pre-training students).[15] Panel B shows that the mean initial risk assessments of these two groups is not significantly different (t-statistic = 1.33, p = 0.187). This suggests that the level of skepticism in the presence of a non-conforming account appears constant across these two groups and that despite self-selecting into the forensic accounting course; the pre-training students' performance is essentially the same as students who are not enrolled in the course.

Next, we compare students pre-training to students post-training. As reported in Table 1 (Panel B) we find support for H1. We find that students, post-training, assessed a significantly higher likelihood of fraud when confronted with a set of financial statements with a non-conforming account than they had pre-training. Specifically, pre-training, students assessed a mean likelihood of fraud of 5.21, but post-training these same students assessed a mean likelihood of fraud of 7.11 (p-value of the difference = 0.000). In addition, post-training students' assessments were also significantly higher than the assessments of the untrained students (mean = 4.50, p = 0.000). Collectively, these

[15] These pre-training students were enrolled in the MAcc program, and had completed the two-course accounting series several months prior to enrollment in the forensic accounting course.

results support Hypothesis 1 and imply that training provided by a course in forensic accounting may invoke a higher level of initial skepticism than a typical audit sequence, as indicated by the fact that post-training, students are more apt to initially assess higher risk (indicating a higher level of skepticism) when there is evidence of a non-conforming account.

In additional analysis, we compare the post-training students with the panel of experts and find no significant difference between their initial risk assessment ($p = 0.147$). This provides some evidence that merely confronting a non-conforming account does not induce these trained students to overreact with a probability of fraud that is higher than the experts.

[Insert Table 1 here]

Hypothesis 2 examines the effect of fraud training on assigning relevance to fraud risk factors. We examine whether individuals who have fraud training assign a level of relevance that more closely reflects the level of relevance assigned by a panel of experts than do individuals who received no fraud training. Table 2 and Figure 1 show the results of Hypothesis 2.

[Insert Table 2 and Figure 1 here]

Table 2 (Panel A) reports the mean relevance ratings for personal-level fraud risk factors related to persons with an "Opportunity to Commit Fraud." The results show that the mean rating for experts was 6.97, and untrained students provided an average relevancy rating for this group of facts that was significantly lower (mean = 4.99, $p = 0.004$) than the mean rating of the experts. Students pre-training provided a mean

relevancy rating of 6.83, which is not significantly different from the experts. Post-training, these same students had a mean rating for these red-flags of 8.36, which is significantly higher than the mean rating of the experts ($p = 0.021$). Thus, in general, the additional course in forensic accounting appears to have caused students to overstate the relevance of these risk factors relative to the experts. However, when we examine the individual items within the "Opportunity" category, post-training, students ranked five of the six factors statistically the same as the experts, pre-training, students ranked four of the six factors statistically the same as the experts, while the untrained students had no individual factors ranked statistically similar to the panel of experts. This suggests that trained students performed more closely to the experts than the untrained students.

In Panel B we examine the relevancy rating for firm-level risk factors, labeled "Economic Environment" of the firm. We find that the experts placed a relatively low relevancy ranking on these variables (mean = 2.70), and all student groups ranked these facts as statistically more relevant than the experts. The untrained students, assign the lowest relevancy ranking of all the groups (see Figure 1); however, it was still statistically higher than the experts (mean = 3.79, $p = 0.000$). Students, pre-training were also significantly higher than the experts (mean = 4.32, $p = 0.000$). Post-training, students reported an even higher relevance ranking than the experts for these facts (mean = 5.79, $p = 0.001$). In all cases, the students ranked half of the four individual facts significantly higher than the experts.

Panel C reports the results on the third factor, labeled "Common Accounting Questions," facts which conveyed answers to accounting questions an auditor might ask

were he/she confronted by a non-conforming account. We find that untrained students find these facts significantly less relevant than the experts ($t = 6.03$; $p = 0.032$). Pre-training, students report a relevancy rating that is statistically similar to the experts ($t = 7.36$; $p = 9.33$). Once again, post-training students provide a relevancy rating higher than the experts, though only marginally significantly so ($t = 8.48$; $p = 0.071$). Of the five individual facts in this category, the untrained students and the pre-training students provided relevancy ratings similar to the experts for three of the five facts, while the post-training students provided relevancy ratings similar to the experts for four of the five facts.

Collectively, we find mixed results for Hypothesis 2. First, with the exception of the second category of factors ("Economic Environment") for which all three student groups provided higher ratings than the experts, the untrained students consistently assigned significantly lower relevancy ratings to the factors than did the experts. The untrained students also found the factors to be less relevant than did the trained students and only had relevancy ratings significantly the same as the experts on 5 of the total 15 facts. Students, pre-training, possibly because of expectations caused by taking a pre-test in a forensic accounting course, provided relevancy ratings similar to the experts in two of the three categories of factors, but when the factors are broken down into their individual items, ranked fewer items similar to the experts than did the students post-training. On average, post-training, the students perceived the facts to be more relevant than did the experts. However, they also gave a relevancy rating that was statistically

similar to the expert in eleven of the fifteen facts, while pre-training they had given nine of the fifteen individual facts a relevancy rating similar to the experts.

Hypothesis 3 examines the effect of training on the synthesis of fraud risk factors. Specifically, we examine whether individuals who have fraud training incorporate the presence of these fraud risk factors into their risk assessment such that they have greater revised (i.e., final) risk assessments than those who have not received fraud training. As reported in Table 3 and Figure 2, we find that the mean revised risk assessment of 8.33 assigned by students post-training was significantly higher than the risk assessment they had assigned during their pre-test (mean = 6.73, p = 0.000). Post-training, the students also reported a significantly higher revised risk assessment than did the untrained students (mean = 5.29, p = 0.000). This provides support for Hypothesis 3, that fraud training enables students to better incorporate additional fraud risk factors into a revision of their initial risk assessment.

As an additional test, we compare students, post-training, to the panel of experts and find that their risk assessments are not statistically different (p = 0.179). This provides some assurance that despite the fact that post-training students ranked many of the red-flags of fraud as more relevant than did the experts, these ratings did not significantly affect their revised risk assessment in a negative way.

[Insert Table 3 and Figure 2 here]

To control for each participant's initial risk assessments, we report the results of a repeated-measures ANOVA in Table 4. These results show a significant main effect within subjects for the revised risk assessments (p = 0.000) in the comparison of pre-

trained to post-trained students and post-trained students and untrained students, respectively. In addition, we find a significant main effect for training ($p = 0.000$). These results provide additional support for Hypothesis 3.

[Insert Table 4 here]

Hypothesis 4 investigates the long-term effects of a course in forensic accounting. Specifically we predict that students, who have completed a course in forensic accounting and are subsequently examined months after their training was completed, will provide fraud judgments that have not degenerated significantly from the judgments they provided at the conclusion of their classroom experience. Specifically, we are examining whether the students' initial risk assessments, relevancy ratings of fraud risk factors, and their ability to incorporate this additional evidence that fraud might be present into a revision of their initial risk assessment, is either similar to, or significantly different from the judgments they provided on the last day of class.

For this analysis, the trained student participants in this study were contacted seven months after their completion of the course and asked to complete the same case materials. Of the 37 students in the class, 17 trained students responded.[16] As reported in Table 1, post-training students provided an initial risk assessment of 7.11 when confronted with a non-conforming account; and these same students in response to the follow-up questionnaire, provided a mean initial risk assessment of 7.05. This difference is not significant ($p = 0.465$). In addition, this number is not statistically different than

[16] While the implications of this follow up investigation are limited because we cannot control for those participants that did not return the questionnaire, the results of this follow-up analysis provide longitudinal data that is informative about the persistence of this training after the training has passed.

the assessment provided by the panel of experts (p = 0.165). This provides some evidence that the effect of this training persists. Next, we examine whether the students' relevancy ratings for the fraud risk factors has deteriorated over time. As reported in Table 2, Panels A, B, and C (post vs. follow-up) we find that the mean follow-up relevance ratings for all three fraud risk factor categories related were not statistically different from the post-training results (p = 0.105, 0.133 and 0.220). In addition, our analysis revealed that the students (follow-up) were not statistically different from the experts in two of the three fraud-risk categories (Opportunity to commit fraud p = 0.157 and Common Accounting Questions, p = 0.255). On an individual fact level, follow-up students reported fact relevancy statistically similar to the experts in 11 of the 15 facts. Collectively, these results support Hypothesis 4 and suggest that there is evidence of persistence of the increased fraud awareness that results from a course in forensic accounting. In addition, it shows that while the responses did not deteriorate significantly over time, time did moderate the "over relevance" originally assigned to the facts post-training, as student responses came more in line with the expert responses after time had passed. Finally, as reported in Table 3, when asked to provide a revised risk assessment, the average student assessment seven months later did not significantly change from their assessment at the end of class (p = 0.291), and it was still not significantly different from the assessment provided by the panel of experts (p = 0.137).

This is especially important as standard setters suggest that "auditors' sensitivity to the existence of fraud possibly could be dulled over time" (AICPA 2003, 23).

CONCLUSION

In this paper, we compare the performance of students who take a course in forensic accounting to a control group of untrained students (i.e., students who have just completed a traditional two-course auditing series, but are not enrolled in a forensic accounting course), and to a panel of fraud experts. We also make comparisons within the trained group, across periods of time--the first day of the course, the last day of the course, and seven months later. We find that when confronted with a non-conforming account, post-training students reported a significantly higher likelihood that the account was intentionally misstated than did their untrained counterparts. Further, their assessment does not differ significantly from that of a panel of experts. This provides some evidence that this training raises their initial level of skepticism. We find, in general, that when confronted with a series of fraud risk factors (i.e., red flags), post-training students more accurately (as benchmarked by a panel of experts) assess their relevance than untrained students. However, they generally assign a greater relevance to each item than do the experts. Our results also show that after participants are made aware of these fraud risk factors, they made a revised risk assessment that was significantly higher than their initial risk assessment. In addition, their revised risk assessment was significantly higher than their untrained counterparts even after controlling for all participants' initial risk assessments. We also find that after incorporation of the risk factors in their risk assessments, post-training students' revised assessments were not significantly different than those of a panel of experts. This provides some evidence that while they found the red flags more relevant than did the

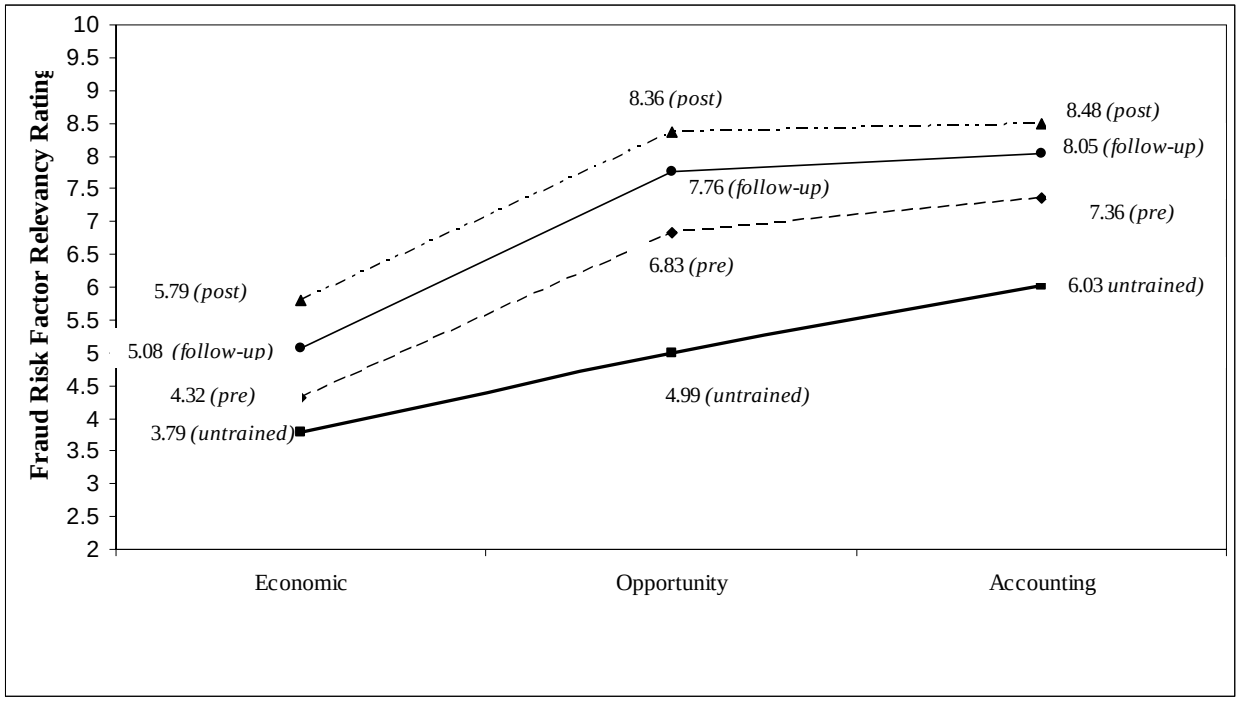
experts, their factor ratings did not result in a final risk assessment that might be considered too high (as benchmarked by the experts). We believe this provides some comfort that trained students' increased level of skepticism is not excessive. Finally, we provide evidence that the results of the trained students are sustained seven months after their training, suggesting that a course that emphasizes forensic accounting will result in increased skepticism levels and related fraud judgments that are sustainable.

The implications of these results are important to practitioners, standard setters, and accounting researchers and educators because SAS No. 99 requires auditors to document the fraud risks identified during the audit and to perform audit procedures in response to their fraud risk assessments (AICPA 2002). Additionally, accounting firms and universities are investing considerable resources in related fraud training. In this study, we find that a course that focuses on forensic accounting raises students' initial levels of skepticism and tends to make them assess fraud risk factors as more relevant than would a panel of experts. However, when synthesizing the presence of these fraud risk factors, trained students do not over compensate in their revised risk assessment. In light of the heavy costs of fraud to the profession (Bonner et al. 1998), these results could be of particular interest to firms for their own fraud training programs as well as to universities that are teaching or considering an offering of forensic accounting and/or fraud examination courses as part of their accounting curriculum. Further, this study answers the call for research aimed at providing insights on the effects of training and experience on fraud detection (Nieschwietz et al. 2000).

We acknowledge the limitations of experimental work in general and those particular to this study. It should be noted that the forensic accounting course included a segment using problem-based learning which may have had an effect on students' retention of knowledge. Additionally, our results are limited by the effectiveness of the questionnaire. Prior research suggests that the reason more research has not been done in aiding auditors through training of fraud detection skills is because of the practical problems of using practicing auditors (Wilks and Zimbelman 2004). While our study uses accounting graduate students, as others have done before (Bloomfield 1997; Zimbelman and Waller 1999), we believe our study is the first to provide evidence that giving students a specialized course in forensic accounting will raise their level of skepticism beyond a typical audit series, and that this skepticism will persist over time. Our study's results suggest that students who were trained with a course in forensic accounting reacted much more closely to a panel of experts than did students who had only a traditional auditing course series. Future research could address this issue with practicing auditors.

FIGURE 1

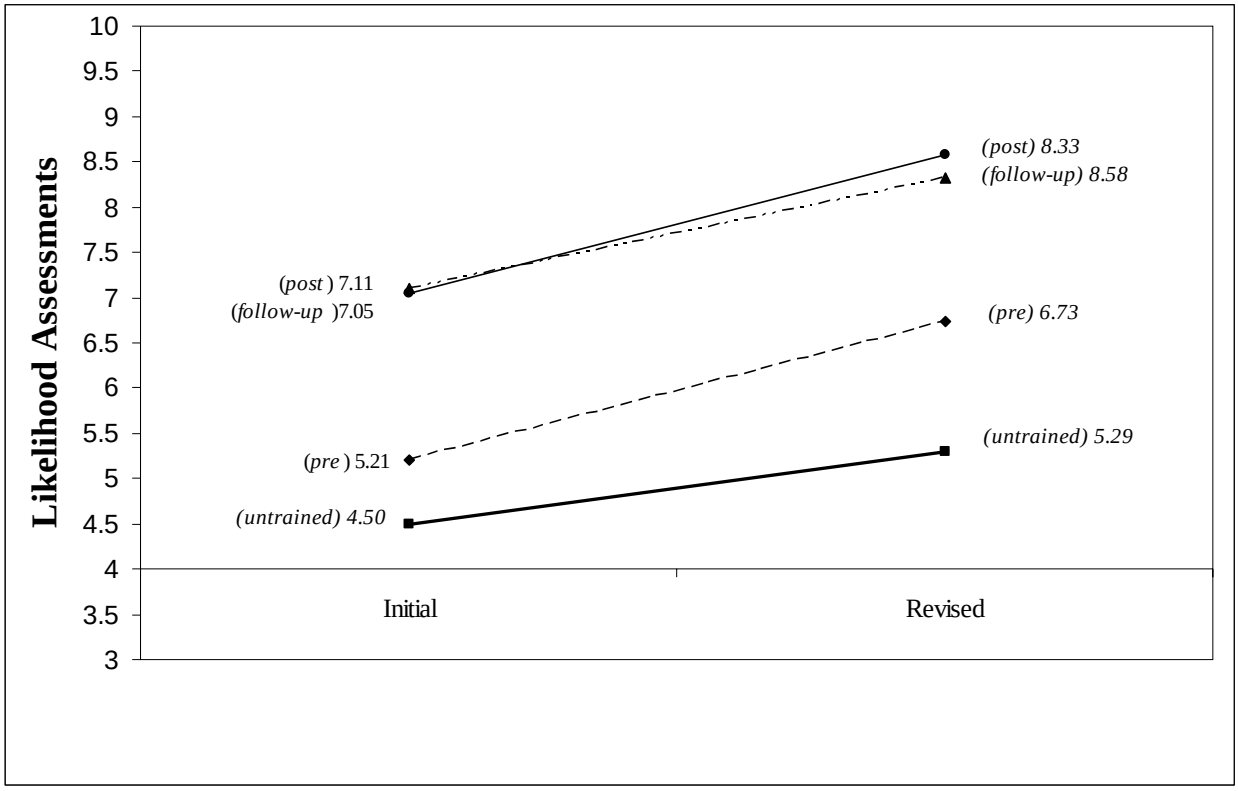
Fraud Risk Factor Relevancy Ratings



This figure illustrates the mean fraud risk factor relevancy ratings for trained students (pre, post and follow-up), as compared to untrained students. Participants were asked to rate the relevancy of economic, opportunity, and accounting fraud risk factors. Relevancy was ranked on an 11-point Likert scale with end points labeled 0, not at all relevant and 10, being extremely relevant. Untrained students have completed a typical auditing series consisting of two audit courses. Pre-training students have completed the two-course auditing series and have now enrolled in a forensic accounting course. Post-training students have just completed the forensic accounting course. Follow-up are these same students seven months later.

FIGURE 2

Initial and Revised Risk Assessments



This figure illustrates the change in mean risk assessments for trained students (pre, post and follow-up) as compared to untrained students between their initial risk assessment and their assessment after being made aware of various facts which included several red flags of fraud. Participants were asked to provide the likelihood that the highlighted area of concern (bad debt expense) was caused by an intentional misstatement (fraud) rather than by an unintentional misstatement (error), on an 11-point Likert scale with endpoints labeled 0, not at all likely and 10, extremely likely in Part 1 and Part III of the experiment, respectively. Untrained students have completed a typical auditing series consisting of two audit courses. Pre-training students have completed the two-course auditing series and have now enrolled in a forensic accounting course. Post-training students have just completed the forensic accounting course. Follow-up are these same students seven months later.

TABLE 1
Tests of Hypotheses 1 and 4: The Effect of Fraud Training on Initial Risk Assessments

Panel A: Mean (Standard Deviation) of Initial Assessments of Risk for Trained and Untrained Students [a]

	Students			
Untrained	**Pre-Training**	**Post-Training**	**Follow-up**	**Expert Panel**
4.50 (2.35) N=32	5.21 (2.05) N=37	7.11 (2.35) N=36	7.05 (2.01) N=17	5.98 (4.8) N=5

Panel B: Results of T-tests Comparing Means of Initial Assessments of Risk

Comparisons between Groups	**Hypothesis Tested**	**T-Statistic**	**p-value** [b]
Pre vs. Post	H1	3.99	0.000
Untrained vs. Post	H1	4.89	0.000
Untrained vs. Pre	--	1.33	0.187
Untrained vs. Follow-up	--	3.98	0.000
Pre vs. Follow-up	--	3.10	0.002
Post vs. Follow-up	H4	0.09	0.465
Post vs. Expert Panel	Add'l test – H1	1.17	0.147
Follow-up vs. Expert Panel	Add'l test – H4	1.06	0.165

[a] Descriptive statistics for participants' revised assessments of the likelihood that the highlighted area of concern (bad debt expense) was intentional rather than unintentional on an 11-point Likert scale with endpoints labeled 0, not at all likely and 10, extremely likely.
[b] P-values for tests of hypotheses are one-tailed. All other p-values are two-tailed.
Untrained students have completed a typical auditing series consisting of two audit courses. Pre-training students have completed the two-course auditing series and have now enrolled in a forensic accounting course. Post-training students have just completed the forensic accounting course. Follow-up are these same students seven months later.

Table 2. The Effect of Fraud Training on the Relevancy Ratings of Fraud Risk Factors

Panel A: Mean (Standard Deviation) for Relevance Ratings for Personal-level Risk Factors for Persons with an "Opportunity to Commit Fraud" [a]

Expert Panel	Untrained	Pre	Post	Follow-up
6.97	4.99	6.83	8.36	7.76
(0.94)	(0.93)	(1.50)	(1.06)	(1.27)
N=5	N=32	N=37	N=36	N=17
P-value of significant difference in relevancy rating as compared to Expert Panel [b]	0.004	0.792	0.021	0.157
Number of facts with a relevance rating statistically **different** than experts	6 of 6	2 of 6	1 of 6	1 of 6

Comparisons between Groups	Hypothesis Tested	T-Statistic	p-value [b]
Pre vs. Post	H2	5.04	0.000
Untrained vs. Post	H2	11.36	0.000
Post vs. Follow-up	H4	1.67	0.105

Panel B: Mean (Standard Deviation) for Relevance Ratings for Factors Related to "Firm-level Risk Factors for Fraud" (i.e.,, The firm's Economic Environment) [a]

Expert Panel	Untrained	Pre	Post	Follow-up
2.70	3.79	4.32	5.79	5.08
(1.16)	(1.60)	(1.84)	(2.07)	(1.25)
N=5	N=32	N=37	N=36	N=17
P-value of significant difference in relevancy rating as compared to Expert Panel [b]	0.000	0.000	0.001	0.005
Number of facts with a relevance rating statistically **different** than experts	2 of 4	2 of 4	2 of 4	2 of 4

Comparisons between Groups	Hypothesis Tested	T-Statistic	p-value [b]
Pre vs. Post	H2	3.00	0.001
Untrained vs. Post	H2	4.20	0.000
Post vs. Follow-up	H4	1.52	0.133

Panel C: Mean (Standard Deviation) for Relevance Ratings for Factors Related to "Common Accounting Questions" [a]

Expert Panel	Untrained	Pre	Post	Follow-up
7.40	6.03	7.36	8.48	8.05
(0.99)	(0.99)	(1.46)	(1.08)	(1.22)
N=5	N=32	N=37	N=36	N=17
P-value of significant difference in relevancy rating as compared to Expert Panel [b]	0.032	0.933	0.071	0.255
Number of facts with a relevance rating statistically **different** than experts	2 of 5	2 of 5	1 of 5	1 of 5

Comparisons between Groups	Hypothesis Tested	T-Statistic	p-value [b]
Pre vs. Post	H2	3.78	0.000
Untrained vs. Post	H2	8.53	0.000
Post vs. Follow-up	H4	1.25	0.110

[a] Descriptive statistics for participants are participants' responses to whether a factor was relevant based on an 11-point Likert scale with endpoints labeled 0, not at all relevant, and 10, extremely relevant.
[b] P-values reported are two-tailed.

TABLE 3
Tests of Hypotheses 3 and 4: The Effect of Fraud Training on Revised Risk Assessments

Panel A: Mean (Standard Deviation) of Revised Assessments of Risk for Trained and Untrained Students [a]

	Trained Students			
Untrained	**Pre-Training**	**Post-Training**	**Follow-up**	**Expert Panel**
5.29 (2.54) N=32	6.73 (1.95) N=37	8.33 (1.41) N=36	8.58 (1.62) N=17	7.30 (1.95) N=5

Panel B: Results of T-tests Comparing Means of Revised Assessments of Risk

Comparisons between Groups	**Hypothesis Tested**	**T-Statistic**	**p-value** [b]
Pre vs. Post	H3	4.03	0.000
Untrained vs. Post	H3	5.97	0.000
Untrained vs. Pre	--	2.58	0.012
Untrained vs. Follow-up	--	5.50	0.001
Pre vs. Follow-up	--	3.66	0.000
Post vs. Follow-up	H4	0.56	0.291
Post vs. Expert Panel	Add'l test – H3	1.04	0.179
Follow-up vs. Expert	Add'l test – H4	1.23	0.137

[a] Descriptive statistics for participants' revised assessments of the likelihood that the highlighted area of concern (bad debt expense) was intentional rather than by unintentional on an 11-point Likert scale with endpoints labeled 0, not at all likely and 10, extremely likely.

[b] P-values for tests of hypotheses are one-tailed. All other p-values are two-tailed.

Untrained students have completed a typical auditing series consisting of two audit courses. Pre-training students who have completed the two-course auditing series and have now enrolled in a forensic accounting course. Post-training students have just completed the forensic accounting course. Follow-up are these same students seven months later.

TABLE 4
Tests of Hypothesis 3: The Effect of Fraud Training on Revised Risk Assessments Controlling for Initial Risk Assessments

Panel A: Results of a Repeated-Measures ANOVA of Training Between-Participants on the Revision to the Risk Assessments for Trained Students (Pre- and Post-Training)

Source of Variation	df	SS	MS	F-statistic	p-value
Between-Participants					
Training	1	111.66	111.66	18.09	0.000
Error	71	438.39	6.18		
Within-Participants					
Revision	1	68.28	68.28	79.82	0.000
Revision x Training	1	0.77	0.77	0.91	0.345
Error	71	60.73	0.86		

Panel B: Results of a Repeated-Measures ANOVA of Training Between-Participants on the Revision to the Risk Assessments for Trained (Post-Training) and Untrained Students

Source of Variation	df	SS	MS	F-statistic	p-value
Between-Participants					
Training	1	270.17	270.17	37.75	0.000
Error	66	472.41	7.16		
Within-Participants					
Revision	1	34.53	34.53	20.52	0.000
Revision x Training	1	1.53	1.53	0.91	0.343
Error	66	111.08	1.68		

[a] Descriptive statistics for participants' revised assessments of the likelihood that the highlighted area of concern was caused by fraud, on an 11-point Likert scale with endpoints labeled 0, not at all likely and 10, extremely likely.
[b] P-values reported are one-tailed.

REFERENCES

American Institute of Certified Public Accountants (AICPA). 2002. *Consideration of Fraud in a Financial Statement Audit.* Statement on Auditing Standards No. 99 (October 15). New York, NY: AICPA.

_____. 2003. *AICPA Practice Aid Series, Fraud Detection in a GAAS Audit: SAS No. 99 Implementation Guide.* New York, NY: AICPA.

Asare, S., and A. Wright. 2004. The effectiveness of alternative risk assessment and program planning tools in a fraud setting. *Contemporary Accounting Research* Summer 2004 (21): 325-352.

Barrows, H. S., and R. M. Tamblyn. 1980. *Problem-based Learning*. New York, NY: Springer.

Beasley, M., J. Carcello, and D. Hermanson. 1999. *Fraudulent Financial Reporting: 1987-1997: An Analysis of U.S. Public Companies*. Committee of Sponsoring Organizations of the Treadway Commission. Jersey City.

Bloomfield, R. J. 1997. Strategic dependence and the assessment of fraud risk: A laboratory study. *The Accounting Review* 72 (4): 517-538.

Blumberg P., and J. A. Michael. 1991. The development of self-directed learning behaviors in a partially teacher-centered problem-based learning curriculum. *Journal of Teaching and Learning in Medicine* 4 (1): 3-8.

Bonner, S., Z. V. Palmrose, and S. Young. 1998. Fraud type and auditor litigation: An analysis of SEC Accounting and Auditing Enforcement Releases. *The Accounting Review* 73 (4): 503-532.

Carpenter, T. D. 2007. Audit team brainstorming, fraud risk identification, and fraud risk assessment: Implications of SAS No. 99. *The Accounting Review* 82 (5): 1119-1140.

Durtschi, C. 2003. The Tallahassee BeanCounters: A problem-based learning case in forensic auditing. *Issues in Accounting Education* 18 (2): 137-173.

Durtschi, C., and R. R. Fullerton. 2005. Teaching fraud detection skills: A problem-based learning approach. *Journal of Forensic Accounting* VI (1): 187-212.

Eining, M. E., D. R. Jones, and J. K. Loebbecke. 1997. Reliance on decision aids: An examination of auditors' assessment of management fraud. *Auditing: A Journal of Practice & Theory* 16 (2): 1-19.

Elliott, R. 2002. Twenty-first century assurance. *Auditing: A Journal of Practice and Theory* 21 (1): 139-146.

Glover, S. M. 1997. The influence of time pressure and accountability on auditors' processing of non-diagnostic information. *Journal of Accounting Research* 35 (2): 213-226.

Hackenbrack, K. 1992. Implications of seemingly irrelevant evidence in audit judgment. *Journal of Accounting Research* 30 (1): 126-136.

Hoffman, V. B. and J. M. Patton. 1997. Accountability, the dilution effect, and conservatism in auditors' fraud judgments. *Journal of Accounting Research* 35 (2): 227-237.

Johnson, P. E., S. Grazioli, and K. Jamal. 1993. Fraud detection: Intentionality and deception in cognition. *Accounting Organizations and Society* 18 (5): 436-488.

Knapp, C., and M. Knapp. 2001. The effects of experience and explicit fraud risk assessment in detecting fraud with analytical procedures. *Accounting, Organizations and Society* 26 (1): 25-37.

Lindberg, D. L. 1999. Instructional case: Lakeview Lumber, Inc.: A study of auditing issues related to fraud, materiality and professional judgment. *Issues in Accounting Education* 14 (3): 497-515.

Messier, W. F., S. M. Glover, and D. F. Prawitt. 2004. *Auditing & Assurance Services: A Systematic Approach*. New York, NY: McGraw-Hill.

Nieschwietz, R., J. Schultz, and M. Zimbelman. 2000. Empirical research on external auditors' detection of financial statement fraud. *Journal of Accounting Literature*: 190-246.

Norman G. R., and H. G. Schmidt. 1992. The psychological basis of problem-based learning: A review of evidence. *Academic Medicine* 67 (9): 557-565.

Nunnally, J.D. 1978. *Psychometric theory*. New York: McGraw-Hill.

Pincus, K. 1989. The efficacy of a red flags questionnaire for assessing the possibility of fraud. *Accounting, Organizations and Society* 14 (1/2): 153-163.

Public Company Accounting Oversight Board (PCAOB). 2004. Standing Advisory Group Meeting: Financial Fraud, September 8-9, www.pcaobus.org.

_____. 2007. *Observations of Auditors' Implementation of PCAOB Standards Relating to Auditors' Responsibilities with Respect to Fraud*. Release No. 2007-01, January 22, 2007. Washington D.C.: PCAOB.

Public Oversight Board (POB). 2000. *The Panel on Audit Effectiveness: Report and Recommendations*. Stamford, CT: POB.

Wilks, T., and M. Zimbelman. 2004. Using game theory and strategic reasoning concepts to prevent and detect fraud. *Accounting Horizons* 18 (3): 173-184.

Zimbelman, M., and W. Waller. 1999. An experimental investigation of auditor-auditee interaction under ambiguity. *Journal of Accounting Research* 37 (Supplement): 135-155.