
AN EXPERIMENTAL ASSESSMENT OF
BUSINESS STUDENTS'
PERFORMANCE: RECOGNIZING RISK
FACTORS ASSOCIATED WITH
MISAPPROPRIATION OF ASSETS

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ABSTRACT

This paper reports the results of a study that was conducted to investigate the performance of senior-level business students as it pertains to recognizing certain clues or risk factors that are frequently associated with the misappropriation of entity assets. Based on three of the risk factors identified in SAS No. 82, an experiment was used to examine differences in performance based on academic major, fraud-specific knowledge, and certain experiences of the students.

The primary contributions of this study are the discovery that: (1) an increasing number of risk factors; (2) knowledge accumulated in an accounting curriculum; (3) reading additional articles on the topic of employee theft; and (4) direct encounters with employee theft in the workplace were positively and significantly associated with recognizing an increased possibility that employee theft may be occurring. The results also indicate that neither employer-provided fraud training, nor part-time

work experience, helped the subjects recognize an increased level of vulnerability of an organization to employee theft.

INTRODUCTION

Many fraud detection experts, public accounting firms, researchers, and managers believe that misappropriation of assets is a growing problem. KPMG, the international accounting firm, has conducted a number of fraud surveys of corporate officials during the 1990s. In their 1993 study, 96% of the managers who participated in the survey indicated they were knowledgeable about the ways in which fraud can occur in an organization. That number dropped to 84% in 1995 and to 80% in 1998. Each year, approximately 75% of the managers indicated that they considered fraud to be a major problem for business and about two-thirds of the respondents believed the incidence of fraud would increase.

The accounting profession is equally concerned about the threat that fraud represents to the business community. The importance of this issue is underscored by Statement on Auditing Standards (SAS) No. 82, *Consideration of Fraud in a Financial Statement Audit* (AICPA, 1997). This statement identifies a number of risk factors (sometimes called "red flags" or simply "clues") that are frequently associated with the misappropriation of assets. SAS No. 82 follows recommendations made by the Treadway Commission (1987, p. 15) that, "the business and accounting curricula should help students develop stronger analytical, problem solving, and judgment skills to help prevent, detect and deter fraudulent financial reporting . . ."

This is also an important issue due to the magnitude of losses from misappropriation of assets. Calhoun and Luizzo (1992) note that the cost of economic crime in 1990 was at least \$114 billion, that one dollar is lost to external crime vis-à-vis eight dollars to internal crime, and that one out of three employees is involved in some type of misappropriation of entity assets. Given this widespread concern about employee theft, one might ask how well we are preparing students for this challenging work environment. Can students recognize risk factors that are commonly associated with the misappropriation of entity assets? The purpose of this study is to examine the performance of senior-level accounting students and senior-level management students regarding the identification of clues that could indicate the presence of fraudulent theft of assets within an organization. The current study uses the terms "fraud" and "employee theft" to describe the misappropriation of entity assets.

The remainder of this paper proceeds as follows. The next two sections provide background information on misappropriation of assets and schema

theory. The following section develops the research hypotheses. We then provide an overview of the research methodology. Subsequent sections include the results, concluding remarks, and recommendations.

BACKGROUND ON MISAPPROPRIATION OF ASSETS

KPMG's annual fraud surveys indicate that the most common type of fraud is misappropriation of assets. Norman Inkster, President of KPMG Investigation and Security in Toronto, believes that many factors in current business environments – such as downsizing, de-layering, and sophisticated technology – can create opportunities for fraud (Gauthier, 1995). For example, when a company downsizes, layers of management oversight and control are eliminated. This usually results in more responsibility for fewer managers. In such instances, managers might have more opportunities to override internal controls, which would make the detection of misappropriation of assets more difficult.

Seidman (1990) used a survey instrument to gain insights pertaining to more than 500 cases of fraud and was able to develop a profile of a typical perpetrator, a description of commonly used schemes, and a summary of the methods used by perpetrators to avoid detection. Seidman claims that the outside activities of employees, their lifestyles, and their financial stresses all require careful and continuous scrutiny.

Welch et al. (1996) noted that the internal audit function restricts the ability of perpetrators to access a wide variety of accounts in sustaining a fraud. These authors analyzed 2,573 reported cases involving the misappropriation of assets in both the public and private sectors, focusing on the victims of the fraud, the characteristics of the perpetrators, the schemes that were used, and the methods of detection. The results indicate that poor company attitudes (control environment) toward existing controls helped the perpetrators commit the fraud. These authors also found that when proper separation of duties was lacking, when employees lacked sufficient competence, or when employees were able to manipulate documentation (internal controls), the probability of employee theft increased significantly. Weak internal controls were often used to the advantage of the perpetrator.

Several researchers and forensic accountants have concluded that purchasing fraud (i.e. fraudulent disbursement of funds) is the most prevalent method employees use to misappropriate assets (Robertson, 1997; Thornhill, 1996; Levy, 1985). Thornhill (1996), a forensic accountant, notes that purchasing fraud fits into the broad category of input tampering, which involves the entry of false or fraudulent data into a computer and can include data that have been altered, forged, or counterfeited. Thornhill (1996) suggests that the persons who

most often perpetrate a purchasing fraud are trusted, authorized computer users who have either neutralized or avoided any controls that are in place.

It is difficult to detect the misappropriation of assets while the fraudulent activity is in progress. As Albrecht (1996, p. 26) points out, it is not an event that is normally witnessed firsthand. Rather, it is “. . . a crime shrouded in ambiguity, and is sometimes difficult even to determine whether or not a crime has actually been committed.” Too frequently the scheme is discovered by accident. Green and Calderon (1996) believe, however, that “red flags” can create crucial pieces of evidence in signaling the likelihood of employee theft.

Albrecht et al. (1980) conducted an extensive review of existing fraud-related literature to identify the individual and organizational factors (red flags) that might be used to detect employee fraud. Albrecht and Romney (1986) empirically analyzed the predictive ability of the 87 red flags identified in Albrecht et al.'s (1980) study. Results suggest that only about one-third of the red flags were significant predictors of employee theft. Among the red flags that were significant predictors were: (1) failure to require executives to take vacations of more than one or two days at a time; (2) too much trust in key executives (overlooking controls); (3) inadequate internal controls or failure to enforce controls; and (4) poor accounting records. These same red flags were present in the actual instance of misappropriation of assets that was adapted for the present study.

Table 1. Risk Factors Relating to Misappropriation of Assets.*

a. Risk Factors Relating to Susceptibility of Assets to Misappropriation:

- Large amounts of cash on hand
- Inventory characteristics such as small size, high demand, high value
- Easily convertible assets
- Fixed asset characteristics, such as small size, marketability

b. Risk Factors Relating to Controls:

- Lack of management oversight
 - No screening procedures for employees with access to vulnerable assets
 - Lack of appropriate segregation of duties
 - Lack of appropriate authorization and approval of transactions
 - Poor physical safeguards over cash, investments, inventory, or fixed assets
 - Lack of documentation for transactions
 - Lack of mandatory vacations for employees
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* *Source:* Consideration of Fraud in a Financial Statement Audit, Statement on Auditing Standards No. 82. American Institute of Certified Public Accountants (1997).

SAS 82 provides several examples of red flags (risk factors) believed to be associated with misstatements arising from misappropriation of assets. This statement identifies two categories of risk factors: (a) the general susceptibility of assets to misappropriation, and (b) specific control weaknesses. The initial category pertains to the nature of an entity's assets and the degree to which they are subject to theft, while the latter pertains to the lack of controls designed to prevent or detect the misappropriation of assets (AICPA, 1997, para. 18). Table 1 provides a list of the two groups of risk factors derived from SAS 82.

BACKGROUND ON SCHEMA THEORY

According to Shuell (1986), information processing theories focus on how individuals attend to environmental events; encode information and relate that new information to knowledge in memory; store new knowledge in memory; and then retrieve and apply that knowledge when it is needed. Under this broad category of theories, psychologists developed schema theory to examine the idea that much of our knowledge seems to be integrated, that we store like information together, and that we activate existing knowledge structures (schemata) to interpret new events (Gagne et al. 1993).

Gagne et al. (1993) note that achieving a schema is a two-step process. First, a person must *construct* a schema, and then with instruction and experience the schema can be *developed*. Individuals construct a bundle of concepts (a schema) pertaining to a particular activity and then filter new information from the surrounding environment through that schema when making a decision. For example, a fraud schema is a convenient way to represent a broad framework of fraud information. Then, when a new instance of employee theft is encountered, even if it is slightly different from earlier instances, the observer will recognize it as having a sufficient number of features in common with the framework that it will also be categorized as fraud. The construction and continued development of a schema in a given area leads to expertise.

Numerous studies in psychology have employed the expert-novice paradigm to study schema theory as it relates to differences in performance. These studies encompass a wide variety of contexts such as chess, electronics, football, writing, and mathematics (Chi et al., 1981, 1982, 1988; Walker, 1987; Mayer, 1982; Larkin et al., 1980; Chi, 1978; Chase and Simon, 1973; de Groot, 1966, 1965). Gagne et al. (1993) note that these researchers typically identify a group of experts and a group of novices, give both groups a problem to solve, then compare the performance of the two groups. By comparing the actions of individuals with different levels of expertise in performing different tasks, cognitive

psychologists are able to identify factors that account for domain expertise. Alba and Hutchinson (1987) reviewed a number of these psychological studies and found that the results generally supported the idea that increased familiarity with a task leads to increased ability to analyze information and to increased expertise. On the other hand, novices are more likely to oversimplify decisions, to be inefficient in their search strategies, and to ignore the complexities of the decision process.

Accounting researchers began studying expertise in an auditing context in the mid-1970s, using either a behavioral approach or a cognitive approach, to understand professional judgment. The behavioral approach is largely based on Einhorn's (1974) model of the judgment process. Bedard (1989) argues that the behavioral view of expertise ignores the relative differences in the cognitive processes of experts and novices and the way these processes might influence their judgments. The cognitive view of expertise focuses on cognitive processes and the knowledge base underlying the behavior of experts and novices in an attempt to understand how experts make decisions.

After a decade of research in this area, a number of review articles were published (Choo, 1989; Bedard, 1989; Colbert, 1989; Davis & Solomon, 1989; Bonner & Pennington, 1991; Bedard & Chi, 1993; Libby & Luft, 1993). Choo's (1989) review included the expert-novice research in accounting (auditing) and in psychology. In comparing these two bodies of literature, Choo noted that the accounting and auditing literature is preoccupied with the input, process, and output model, which is in marked contrast to the studies in psychology where the focus is on the underlying difference in experts' versus novices' knowledge structures. Further, Choo (1989, p. 125) suggests that, "... expertise may be broadly defined as superior schemas (in amount and organization) developed through a gradual process of abstracting domain-specific knowledge on the basis of experience."

Colbert's (1989) review examined the impact of experience on expertise in several auditing tasks. She found that experience may be vital for complex or unstructured decisions, but not necessary for relatively simple or structured judgments. Bonner and Pennington's (1991) review examined cognitive processes and knowledge as determinants of auditor expertise. Their results suggest that instruction is important for learning and for good task performance. Further, their review suggests a need for more research in several areas of the planning stage of the audit, such as management fraud assessments.

Davis and Solomon (1989) reviewed the accounting literature that examined experience as a determinant of expertise. These authors are of the opinion that experience can impact the development of expertise in a variety of contexts when the experience facilitates the formation of problem categories. Then, the

experience can be successfully applied (or transferred) to a variety of situations encountered at a later point in time. Hence, researchers who use experience as an expertise surrogate should consider task-specific experience of the accountant rather than tenure.

"Expert" subjects in these auditing studies have variously been defined as audit professionals (Ashton & Kramer, 1980); individuals with greater years of auditing experience (Tubbs, 1992); those who had experience at or above the level required to complete the task (Colbert, 1989); or audit professionals who had reached the staff level where the required normative skills are developed (Abdolmohammadi & Wright, 1987). "Novice" subjects were students who had no audit experience, audit professionals with fewer years of auditing experience, individuals who did not have the knowledge to complete the task, or subjects occupying lower staff levels.

While these review articles provide a useful summary of different aspects of this research, several individual studies also focus on a cognitive approach to explain performance differences in auditing tasks. These studies examine and measure performance (expertise) based on one or a combination of the following factors: knowledge, experience, and ability. For example, Bonner and Lewis (1990) developed four audit tasks to measure the differences in audit expertise of practicing auditors (audit seniors and senior managers) and undergraduate auditing students with no public accounting experience. Based on their results, these authors opine that future research must delineate expertise on the basis of specific training, experience, and ability variables. Tubbs (1992) examined the effect of experience on the auditor's knowledge of errors and irregularities. Tubbs designed two tasks that were completed by auditors in public accounting and students in an introductory auditing class. He found that, consistent with previous audit research, subjects with greater auditing experience recalled more errors, were more accurate about the errors they identified, and recalled more atypical errors.

DEVELOPMENT OF HYPOTHESES

In the accounting literature, several factors have been studied that are thought to contribute to domain expertise. These include *experience* (Bonner et al., 1997; Bonner & Walker, 1994; Libby & Tan, 1994; Libby, 1993; Tubbs, 1992; Frederick, 1991; Ashton, 1991; Bonner, 1990; Bonner & Lewis, 1990), *knowledge* (Bonner et al., 1997; Choo, 1996; Bonner & Walker, 1994; Libby & Tan, 1994; Libby & Luft, 1993; Ashton, 1991; Bonner, 1990; Bonner & Lewis, 1990), and *ability* (Bonner & Walker, 1994; Libby & Tan, 1994; Libby & Luft, 1993; Bonner & Lewis, 1990). These studies use structured tasks to

cases. They also compare the proposed detection knowledge base with the knowledge base of several experienced auditors. These researchers conclude that one must continually learn new knowledge, and learn how to use what they already know, to successfully detect fraud.

For the purposes of this study, domain-specific knowledge might be obtained from two sources: (1) fraud-specific training, and (2) reading of articles that report the facts and circumstances surrounding actual instances of employee theft which have been uncovered in various entities. Regarding the fraud-specific training, students were asked if they had attended any employer-provided training on the topic of employee theft. Students were also asked whether they had read any articles on the topic of employee theft in local newspapers, the Wall Street Journal, news magazines (such as Newsweek), or similar sources. For those students who responded affirmatively, the next question asked the students to indicate the number of articles they had read in the past 30 days on the topic of employee theft. To test possible performance differences of students based on these two sources of knowledge, we use the following two hypotheses.

H2: When confronted with increasing numbers of fraud risk factors, individuals who have had fraud-specific training will assess the possibility of employee theft at a higher level than will individuals who have not had such training.

H3: When confronted with increasing numbers of fraud risk factors, individuals who read articles on the topic of fraud will assess the possibility of employee theft at a higher level than will individuals who do not read such articles.

Experience

A number of studies have measured experience by years of work experience or by tenure-based titles (Frederick et al., 1994; Messier, 1983; Chi et al., 1982; Hamilton & Wright, 1982). Regardless of prior training received, actual work experience should impact the development of schemata. Specifically, the greater the number of years of work experience that individuals gain, the greater the likelihood that they would have developed an awareness of what might be considered "acceptable" in the workplace. Experienced individuals would then be better able to perceive abnormalities. We use the following hypothesis to test possible performance differences between students who have more years of part-time work experience and those who have relatively little work experience.

H4: When confronted with increasing numbers of fraud risk factors, individuals who have more years of work experience will assess the possibility of employee theft at a higher level than will individuals who have fewer years of work experience.

The second measure of experience examines the impact on schema development of a personal encounter with employee theft in the workplace. According to Ashton (1991), Larkin et al. (1980), and Elstein et al. (1978), experience must be related to the task since expertise is domain specific. Ashton (1991) investigated the relationship of experience and knowledge as potential determinants of audit expertise and concluded that even the most experienced auditors have limited direct exposure to financial statement errors. As a result, Ashton (1991, p. 219) suggests that "audit experience should be viewed as relating to specific audit tasks rather than as a singular, all encompassing concept and that particular experience must be understood as it relates to a particular type of knowledge."

An actual encounter with employee theft in the workplace and any subsequent retrospection done, in hindsight, as to the weaknesses that lead to it and the warning signals that might have accompanied the incident, can alter any extant schemata. Thus, in the current study, it is hypothesized that such experiences would have an impact on fraud risk assessments. We use the following hypothesis to test possible performance differences between students who have had direct exposure to employee theft in their place of employment and those who have not had this type of experience.

H5: When confronted with increasing numbers of fraud risk factors, individuals who have had experience with employee theft in the workplace will assess the possibility of fraud at a higher level than will individuals who have not had such experience.

RESEARCH METHODOLOGY

Experimental Design

This study employs a $2 \times 2 \times 2$ factorial experiment, utilizing three of the fraud risk factors contained in SAS No. 82. These risk factors are measured at two levels (absent or present). This factorial design requires the formation of eight treatment groups, called scenarios in this study. Each scenario contains a different combination of the three risk factors, and the scenarios were randomly assigned to each participant. A between-subjects design was selected (each student read only one scenario) to overcome demand effects. That is, due to the infrequent nature of fraudulent activity, if each student were to read several

Table 2. Experimental Design.

| | | | | | |
|---|----|----|----|----|----------------|
| R | A1 | B1 | C1 | EQ | Scenario No. 1 |
| R | A1 | B1 | C2 | EQ | Scenario No. 2 |
| R | A1 | B2 | C1 | EQ | Scenario No. 3 |
| R | A1 | B2 | C2 | EQ | Scenario No. 4 |
| R | A2 | B1 | C1 | EQ | Scenario No. 5 |
| R | A2 | B1 | C2 | EQ | Scenario No. 6 |
| R | A2 | B2 | C1 | EQ | Scenario No. 7 |
| R | A2 | B2 | C2 | EQ | Scenario No. 8 |

Where: R = Random assignment of the scenarios to the participants
A = Risk Factor No. 1: Lack of appropriate segregation of duties or independent checks
B = Risk Factor No. 2: Lack of timely and appropriate documentation for transactions
C = Risk Factor No. 3: Lack of mandatory vacations for employees performing key control functions
1 = treatment (risk factor) – present
2 = treatment (risk factor) – absent
EQ = Exit questionnaire that was administered post-test

scenarios – some of which contained more fraud risk factors and others that contained few or no risk factors – the purpose of this research might become transparent to the subject. The experimental design used in the present study is depicted in Table 2.

Subjects

The subjects who participated in this experiment were traditional-age college students: (1) 237 senior-level management students enrolled in a strategic management course, an organization theory course, or an international management course; and (2) 179 senior-level accounting majors who were enrolled in one of seven different sections of an auditing course. The subjects were from three large state universities in the southwest. Professors motivated the subjects to perform in a serious and conscientious manner by awarding various bonus points. Participation was strictly voluntary. Table 3 identifies the sample of participants for this study.

Task and Procedure

The case developed for this study draws upon an actual instance where misappropriation of assets occurred as a result of a government employee creating fictitious invoices. Each participant in the experiment read selected background

Table 3. Sample Identification.

| Group | Description | Total Number |
|---|--|--------------|
| <i>Senior-Level Management Students</i> | | 349 |
| | Delete: duplicates, incomplete information | -36 |
| | junior-level students | -34 |
| | accounting majors enrolled in mgmt courses | -19 |
| | non-traditional age students (born before 1974)* | -23 |
| | Total: | 237 |
| <i>Senior-Level Accounting Students</i> | | 251 |
| | Delete: incomplete information | -2 |
| | non-traditional age students (born before 1974)* | -70 |
| | Total: | 179 |
| <i>Total Number of Participants:</i> | | 416 |

* The purpose of this study is to examine the performance of traditional-age college students relative to recognizing risk factors associated with the misappropriation of assets. Therefore, we reduced our sample to include only those students.

information pertaining to the government office being victimized and then considered only one of eight possible scenarios. After reading the case materials, each subject responded to seven questions. Upon completing the experiment, each subject was given an exit questionnaire. This questionnaire collected demographic information from the students, contained questions utilized as manipulation checks, and solicited the participant's opinion regarding several aspects of employee theft. Case materials are contained in the Appendix.

Variables of Interest

The dependent variable for this study is the fraud risk assessment that is made by each subject. Each participant was asked to assess the possibility that an employee theft might be occurring. The independent variables were three of the risk factors (RF) from SAS No. 82 that were manipulated at two levels (present or absent): (1) lack of appropriate segregation of duties or independent checks, (2) lack of timely and appropriate documentation for transactions, and (3) lack of mandatory vacations for employees performing key control

Table 4. Description of Variables.

| | |
|----------|---|
| FRAUD | The dependent variable. Subject's assessment of the possibility of fraud, measured as a continuous variable, with a range from 0 to 100%. |
| RF | Number of risk factors contained in the scenario read by the subject, ranged from 0 to 3. |
| MAJOR | Academic major of the subject. Measured as a dichotomous variable where 1 = accounting and 0 = otherwise. |
| TRAINING | Whether or not the subject has obtained any training in the detection of employee theft, measured as a dichotomous variable where 1 = yes and 0 = no. |
| ARTICLES | The number of fraud articles the subject has read in the past 30 days, ranged from 0 to 4. |
| PART | Number of years of part-time work experience. |
| THEFT | Whether or not the subject had experienced employee theft at his or her place of employment, measured as a dichotomous variable where 1 = yes and 0 = no. |

functions. Additional variables, not under the direct control of the researchers, were also utilized in this study. These variables are limited to two categories: knowledge and experience.

In the present study, the knowledge variable is measured in three ways. The initial measure (MAJOR) captures whether or not the subject is pursuing an accounting degree. The second measure (TRAINING) identifies whether or not the subject has had any employer-provided training concerning the detection or prevention of employee theft, and the third measure (ARTICLES) reflects the number of articles the subject has read within the past month on the subject of employee theft. Experience is measured by: (1) the number of years of part-time (PART) work experience that the subject has accumulated, and (2) whether or not the subject has experienced employee theft (THEFT) at his or her place of employment. Table 4 contains a definition of all variables used in this study.

RESULTS AND DISCUSSION

The results of Chi-square tests indicate that each manipulation check was significant. Standard diagnostic tests were conducted to confirm that the assumptions

for OLS regression were not violated. The results suggest no major statistical problems.

Descriptive statistics and demographic data are reported in Table 5. The mean age of the accounting students is 21.5 years and the mean age of the management students is 21.8 years. Significantly more management students (16.9%) than accounting students (9.5%) reported that they had acquired training in the detection of employee theft. However, significantly more accounting students (73.7%) reported that they read articles on the topic of fraud than did the management majors (57.8%). Senior-level management students reported significantly more years of part-time work experience, and more exposure to theft in the work environment than their accounting peers. The majority of the

Table 5. Descriptive Statistics.

| | Management | Accounting |
|---|------------|------------|
| <u>KNOWLEDGE:</u> | | |
| Major | 237 | 179 |
| Mean age (in years) | 21.8 | 21.5* |
| Fraud Training | 16.9% | 9.5%* |
| Read Articles (% who said "Yes") | 57.8% | 73.7%* |
| Mean Number of Articles Read | 0.49 | 0.85* |
| <u>EXPERIENCE:</u> | | |
| P/T Work Experience (in years) | 4.2 | 3.6* |
| Experienced Theft at Work | 54.9% | 43.6%* |
| Who has primary responsibility to detect fraud? | | |
| • Management | 50.2% | 60.3%* |
| • Employees | 25.7% | 8.4%* |
| • Internal Auditors | 21.5% | 28.5% |
| • External Auditors | 2.5% | 2.8% |
| Two of the seven questions that the subjects were asked after reading the experimental materials: | | |
| Unintentional Error? | 54.7% | 49.7% |
| Theft Occurring? | 45.8% | 68.1%* |
| Three questions from the exit questionnaire: | | |
| Knowledgeable about fraud? | 42.8% | 44.4% |
| Could detect employee theft? | 54.2% | 51.6% |
| Fraud an important topic? | 88.4% | 91.1%* |

* Significant at 0.05 level.

accounting majors (60.3%) believed that management has primary responsibility for detecting fraud within an entity. On the other hand, only 50.2% of the management majors believed that fraud detection was a management responsibility. This difference of opinion between the two groups is significant at the 0.05 level.

Subjects were also asked to assess whether or not misappropriation of assets had occurred in the scenario studied. The accounting majors (68.1%) were significantly more apt to believe that employee theft of assets might be occurring than were the management majors (45.8%). Finally, while both groups considered the prevention and detection of employee theft an important topic, significantly more accounting majors (91.1%) believed this than did management majors (88.4%).

Table 6 reports the effects of knowledge on the performance of accounting and management students relative to recognizing the risk factors that might signal employee theft. When they were confronted with increasing numbers of fraud risk factors, both accounting majors and management majors noted an increased possibility that fraud might exist. On average, after controlling for MAJOR, each risk factor added 3.545% to the subject's assessment that fraud might be occurring. However, accounting majors consistently assessed the possibility of fraud at a higher level than did their non-accounting counterparts ($t = 8.695$; $p = 0.000$). Specifically, accounting majors assessed the likelihood that employee theft might be occurring at a full 21.4% higher level than did non-accounting majors. These results suggest support for Hypothesis One.

Apparently, the unique classroom instruction that accounting majors receive facilitates the identification of potential risks in a business environment that might lead to increased vulnerability to the misappropriation of assets. This finding corroborates similar results found by Bonner and Pennington (1991) and Bonner et al. (1997) that instruction is important for both learning and good task performance. Bonner et al. (1997) found that acquiring some basic knowledge concerning transaction cycle errors prior to actually experiencing errors (the event) improved learning. Similarly, accounting majors apparently acquire basic knowledge regarding fraudulent activity from the accounting curriculum.

Our results do not support Hypothesis Two. Regarding fraud-specific training, the results suggest that this type of knowledge is not particularly helpful to students in their assessment of the possibility that employee theft might be occurring. However, reading fraud articles does appear to enhance students' performance in assessing the possibility of employee theft at a higher level as risk factors increase ($t = 2.195$; $p = 0.029$), which lends support to Hypothesis Three.

Table 6. Effects of Knowledge ($n = 416$).*

$$Y_i = b_0 + b_1 RF_i + b_2 MAJOR_i + b_3 TRAINING_i + b_4 ARTICLES_i + \varepsilon_i$$

| Variable | Expected Sign | Coefficient | <i>t</i> -statistic | <i>p</i> -value |
|---------------------|------------------------|-------------|---------------------|-----------------|
| Intercept | | 38.751 | 14.330 | 0.000 |
| RF | (+) | 3.545 | 2.588 | 0.010 |
| MAJOR | (+) | 21.361 | 8.695 | 0.000 |
| TRAINING | (+) | 0.587 | 0.169 | 0.866 |
| ARTICLES | (+) | 3.017 | 2.195 | 0.029 |
| <i>F</i> -statistic | 25.116 ($p = 0.000$) | | | |
| Adj. R^2 | 0.189 | | | |

where:

- Y_i = assessment of the possibility of fraud by subject i
- RF_i = number of risk factors (0, 1, 2, or 3) in the Scenario that was randomly assigned to subject i
- $MAJOR_i$ = 1 if the subject is an accounting major, and 0 otherwise
- $TRAINING_i$ = 1 if the subject has fraud-specific training, and 0 otherwise
- $ARTICLES_i$ = the number of fraud articles subject i read in the past 30 days
- ε_i = error term

* A significant correlation exists between MAJOR and ARTICLES. Therefore, we ran the model without MAJOR, and then without ARTICLES. Each variable remained statistically significant and neither coefficient changed significantly. Additionally, the mean age of the management and accounting students is significantly different, so to test the effect of age, we included that variable in the above model and found no significant changes to the results reported above. Age was not found to be a significant variable ($t = 0.223$; $p = 0.824$).

These results could be due to a number of factors. First, the type and level of fraud training that the students experienced was most likely focused on employee theft of meals and incidental inventory items due to the fact that the students' part-time employment was generally in restaurants, music stores, and grocery stores. Also, based on their limited exposure to management levels of responsibility, the students' concept of employee theft is probably limited to low-level, observable stealing.

Daniel et al. (1997) claim that the 1990s most likely will be remembered, among other things, as the decade in which ethics instruction emerged as a vital part of the educational process in training individuals to enter a variety of professions. As a result of this emphasis, perhaps current business students have been required to read a variety of articles that specifically focus on ethical dilemmas that include employee theft. Hence, they might have a better understanding of what would be classified as unethical or illegal behavior.

The effects of experience on the performance of accounting and management students relative to recognizing the risk factors that might signal employee theft are reported in Table 7. The focus of our study is performance of traditional-age college students, and their work experience was almost entirely part-time employment. Our results suggest that the part-time work experience accumulated by these students did not help them to recognize risk factors and then to assess the possibility of employee theft at a higher level as risk factors increase.

Apparently, part-time work experience does not provide experience that might improve an individual's performance in detecting or recognizing the clues that are commonly associated with employee theft. Perhaps this variable should be tested on those with full-time work experience. Such experience implies that the employees are in the work environment more hours each week, which might be essential for accumulating and assimilating clues from the environment (more

Table 7. Effects of Experience ($n = 416$).*

$$Y_i = b_0 + b_1 RF_i + b_2 MAJOR_i + b_3 PART_i + b_4 THEFT_i + \varepsilon_i$$

| Variable | Expected Sign | Coefficient | t-statistic | p-value |
|---------------------|------------------------|-------------|-------------|---------|
| Intercept | | 38.646 | 10.787 | 0.000 |
| RF | (+) | 3.755 | 2.751 | 0.006 |
| MAJOR | (+) | 22.797 | 9.424 | 0.000 |
| PART | (+) | -0.362 | -0.648 | 0.517 |
| THEFT | (+) | 5.244 | 2.154 | 0.032 |
| F-statistic | 25.028 ($p = 0.000$) | | | |
| Adj. R ² | 0.188 | | | |

where:

- Y_i = assessment of the possibility of fraud by subject i
- RF_i = number of risk factors (0, 1, 2, or 3) in the Scenario that was randomly assigned to subject i
- $MAJOR_i$ = 1 if the subject is an accounting major, and 0 otherwise
- $PART_i$ = years of part-time work experience
- $THEFT_i$ = 1 if the subject has had experience with employee theft at his or her place of employment, and 0 otherwise
- ε_i = error term

* A significant correlation exists between PART and THEFT. Therefore, we ran the model without PART, and then without THEFT. PART remained statistically insignificant and THEFT remained statistically significant. Further, neither coefficient changed significantly. We performed an additional sensitivity test by examining PART as a dichotomous variable where 1 = five or more years of work experience, and 0 otherwise. THEFT remained statistically significant.

exposure to potential wrong doing). Also, working at a higher level in the organization offers a wider perspective of the operations of the entity. Nevertheless, based on our results, we find no support for Hypothesis Four.

On the other hand, prior experience with employee theft does appear to sensitize both accounting and management majors to the increased possibility of employee theft ($t = 2.154$; $p = 0.032$). This result, which is both interesting and important, suggests that those who have dealt with fraudulent employee activities in the past would be more likely to detect abnormalities in their work environment and would assess the possibility of employee theft at a higher level than those who have not had such experience. Perhaps individuals who have personally encountered employee theft in a past work environment have included the information gained from this experience in their existing schemata for misappropriation of assets. These results suggest support for Hypothesis Five.

In our final analysis, we consider a single regression equation that includes the three risk factors, the three knowledge variables, and the two experience

Table 8. Effects of Knowledge and Experience ($n = 416$).

$$Y_i = b_0 + b_1 RF_i + b_2 MAJOR_i + b_3 TRAINING_i + b_4 ARTICLES_i + b_5 PART_i + b_6 THEFT_i + \epsilon_i$$

| Variable | Expected Sign | Coefficient | t-statistic | p-value |
|-----------|---------------|-------------|-------------|---------|
| Intercept | | 37.586 | 10.428 | 0.000 |
| RF | (+) | 3.537 | 2.590 | 0.010 |
| MAJOR | (+) | 21.670 | 8.749 | 0.000 |
| TRAINING | (+) | -0.094 | -0.027 | 0.979 |
| ARTICLES | (+) | 2.993 | 2.185 | 0.029 |
| PART | (+) | -0.361 | -0.646 | 0.518 |
| THEFT | (+) | 5.159 | 2.115 | 0.035 |

F-statistic 17.600 ($p = 0.000$)

Adj. R² 0.194

where:

Y_i = assessment of the possibility of fraud by subject i

RF_i = number of risk factors (0, 1, 2, or 3) in the Scenario that was randomly assigned to subject i

$MAJOR_i$ = 1 if the subject is an accounting major, and 0 otherwise

$TRAINING_i$ = 1 if the subject has fraud-specific training, and 0 otherwise

$ARTICLES_i$ = the number of fraud articles subject i read in the past 30 days

$PART_i$ = years of part-time work experience

$THEFT_i$ = 1 if the subject has had experience with employee theft at his or her place of employment, and 0 otherwise

ϵ_i = error term

variables. We report the results of this analysis in Table 8. The risk factors are still significant ($t = 2.590$; $p = 0.010$). The two knowledge variables that were significant in our earlier test remain significant: the student's academic major ($t = 8.749$; $p = 0.000$) and reading fraud articles ($t = 2.185$; $p = 0.029$). Finally, the student's exposure to employee stealing in the workplace ($t = 2.115$; $p = 0.035$) remained a significant variable in helping students recognize the potential vulnerability of the organization when risk factors are present. Thus, the results we obtained by combining the knowledge and experience variables into one regression are consistent with the results we found when looking separately at the knowledge variables, and then the experience variables.

CONCLUSIONS AND RECOMMENDATIONS

Albrecht (1996) maintains that fraud is sometimes so ambiguous that it is difficult even to know whether or not a crime has occurred, and fraud indicators can be present even when fraud does not exist. He notes that, when employee theft is in progress, only the symptoms exist and many of them go unnoticed. Both Ashton (1991) and Loebbecke et al. (1989) contend that fraud detection is difficult because, by its very nature, a fraudulent act is covertly accomplished and most individuals have very little direct experience with detecting and investigating employee theft. With such limited exposure, the presence of risk factors is most likely essential, if not critical, to detection of employee theft within an entity.

Based on three of the risk factors identified in SAS No. 82, an experiment was used to examine the differences in performance of accounting students and management students relative to recognizing these specific risk factors. Our concern is whether they are prepared to meet the specific challenge of identifying employee theft by recognizing the clues that are frequently available when employee wrong doing is in progress.

Many studies have examined knowledge and experience to determine how they might be associated with performance (expertise) in a particular area. This study contributes to that body of literature by identifying which of these factors contribute to expertise in an unstructured task – that of detecting clues common to an instance of misappropriation of entity assets. The primary contributions of this study are the discovery that, for business students: (1) an increasing number of risk factors; (2) the requirements of an accounting curriculum; (3) reading additional articles on the topic of fraud; and (4) direct encounters with employee theft in the workplace are positively and significantly associated with recognizing an increased possibility that employee theft might be occurring. Our results also indicate that employer-provided fraud training obtained by the students was not particularly useful, and an individual's part-time work

experience was not found to be associated with a greater awareness of the possibility of misappropriation of assets when risk factors were present.

The annual fraud surveys conducted by KPMG continue to document the fact that employee misconduct is a growing concern to the business community, which implies that the topic is relevant for classroom instruction if business school graduates are to be properly prepared for the work environment. Although fraud-specific training was not a significant variable, direct exposure to theft in the workplace was significant. We believe academicians, accounting practitioners, and those in business would agree that the preferred method for preparing students to recognize employee theft is classroom instruction and training, not random exposure to employee theft in the workplace.

Specifically, the content and delivery of current fraud training programs may be improved by focusing on actual instances of employee theft so that students might gain the maximum amount of benefit from the instruction. This may be accomplished through a combination of case studies (e.g. Dwyer, 1998; Peterson and Gibson, 1999) and training videos that explain a variety of actual instances of fraud – the perpetrator, the scheme that was used, how the fraud was detected, and other particulars. Such training might prove to be a useful surrogate for actual experience with employee theft. Bonner's (1990) results indicate that task-specific knowledge aided experienced auditors in making better decisions, which suggests focused training and decision aids should improve performance.

Recent studies offer specific suggestions for improved learning from instruction. Bonner and Walker (1994) found that instruction with no experience, and instruction with no feedback, do not produce knowledge. In contrast, subjects gain knowledge when they practice and receive explanatory feedback. Choo's (1996) results indicate that prolonged practice or exposure to the event promotes expertise.

The timing of this instruction also appears to be important. Based on Bonner et al.'s (1997) study, instruction prior to experiencing an event is instrumental to improved learning. These authors investigated the effect of instruction on judgment and decisions by varying the timing of the instruction. Using undergraduate accounting and MBA students, the authors examined whether intensive instruction helped the students apply that knowledge to later audit decisions. Results indicate that instruction facilitated the acquisition of knowledge about transaction cycle errors, and that having this basic category knowledge prior to experiencing errors improved learning.

Overall, the results obtained in our study of senior-level accounting and management majors present an opportunity for each business school to assess its curriculum as it relates to misappropriation of assets and incorporate fraud training into appropriate courses of instruction. More targeted classroom instruction

on the topic of employee theft might provide better preparation for the business environment than chance encounters with a real-life instance of employee theft in the workplace.

Studies of this type have a number of limitations. One such limitation is the choice of subjects that were used in the experiment. The students came from three large universities that have rather diverse student bodies, and should be representative of those population groups. Nevertheless, these universities were all located in the same state and may not be representative of students in other geographical areas. Another limitation might be the experimental case that was used for this research. Since the case relates to a government office, the information could be sufficiently unfamiliar to some students that it may have caused confusion. Finally, due to the large number of subjects required for this study, the experiment was conducted over a three-week period at one of the universities. Thus, students in one class might have shared information with students in other classes. To the extent possible, this problem was mitigated by scheduling the experiments for each course as closely together as possible.

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APPENDIX

CASE MATERIALS

Background Information

Stan Stevens was pleased. He recently accepted the position of Finance Director of Lonely Star, a city in the U.S. with a population just over 60,000. The city has been growing steadily over the past several decades, and collected over \$80 million in gross operating revenues during the last fiscal year.

Stan's picture has already appeared on the front page of the business section of the local newspaper. In the interview for that feature article, Stan shared his vision for the future of the Finance Department and identified a number of long-term goals he hoped to achieve. However, Stan noted that initially he planned to focus his attention and efforts on a variety of day-to-day concerns he had about the department.

First, he plans to streamline procedures in the department by eliminating certain accounts that are rarely used. He also wants to improve the efficiency of his department, so that information can be provided quickly when needed by citizens or other city agencies, thus increasing outsiders' confidence in the department. Stan is particularly keen about addressing the problem of employee turnover. Five of the seven employees in the department have been with the city for less than a year. Stan has been told that the prior Finance Director was very controlling and task-oriented, and that this may have caused department staff to seek employment elsewhere.

Stan noted that the city does not have an internal audit staff, but the local accounting firm of Watson & Watson, CPAs has been the Independent Auditor of the City's Comprehensive Annual Financial Report for more than a decade. In addition to Stan, the Finance Department includes the following personnel:

1. *Linda North, Chief Accountant.* Manages and maintains the General Ledger. Linda is also responsible for general office management and day-to-day operations in the department. Employed by the department for 15 years, Linda is 37. Linda's husband owns a janitorial cleaning service in town and she does all the bookkeeping for her husband's business.

2. *Mary West, Senior Accountant.* Responsible for monitoring fixed assets. She also maintains all records of city fixed/real assets and maintains/monitors all city construction and acquisition of real asset contracts. Employed by the department for 8 months, Mary is 39. Mary's husband is employed by the U.S. Post Office.

3. *Wesley Joines, Staff Accountant.* Cash Manager, and also maintains bank relations, monitors all city investments and debt service requirements, and performs all wire transfers of city funds. Employed by the department for 7 months, Wesley is 32. His wife is a local beautician.

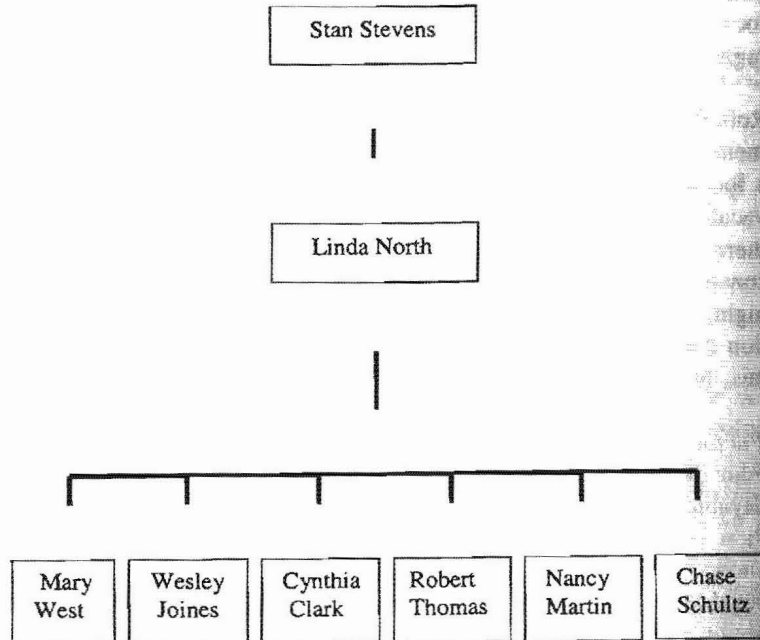
4. *Cynthia Clark, Staff Accountant.* Maintains all records pertaining to Accounts Receivable, invoices those who owe funds, maintains control of all Petty Cash Funds within the city, accounts for all daily deposits from departments and divisions within the city, and is also the secondary payroll clerk. Employed by the department for almost 9 months, Cynthia is 38 and her husband is a math teacher at the High School.

5. *Robert Thomas, Accounts Payable Clerk.* Processes all city payments to payees for last names beginning with A through L. Employed by the department for 20 months, Robert is 36, single, and has lived in town his whole life except for the 4 years he served in the U.S. Navy.

6. *Nancy Martin, Accounts Payable Clerk.* Processes all city payments to payees for last names beginning with M through Z. Employed by the department for 6 months, Nancy is 26 and a single parent. She lives in a near-by town.

7. *Chase Schultz, Payroll Clerk.* Processes all bi-weekly and monthly payrolls and maintains all payroll records. Chase is 31, recently divorced, and has been employed by the department for 10 months. He lives in an older neighborhood of the city.

Organizational Chart
Finance Department of Lonely Star.



Risk Factors: Present

- A1: Over the past four months, Stan has asked Linda several times to develop controls over the accounts payable function for the City. The prior Finance Director had abolished these controls because she thought they were unnecessary. However, Stan knows they are important, so he wants two checks: (1) each accounts payable clerk (Nancy and Robert) to check the other's work, and (2) the senior accountant (Mary) to check the work of both of the accounts payable clerks. The controls have just recently been implemented, and Linda has complained repeatedly about how slowly Mary performs this task. Linda says that Mary is holding up the payments to suppliers, so Linda has volunteered to check Nancy's and Robert's work this week to see how long it would take her to do it.
- B1: Each Tuesday evening, the City runs checks for the invoices that are due that week. Then, on Wednesday morning, the accounts payable clerks verify the amount of each check with the register and also confirm that all

supporting documents are attached. After Mary reviews the registers and documentation, the checks are mailed out to the vendors. Mary is concerned. She is reviewing Nancy's and Robert's work and Mary cannot locate the supporting documents for a \$10,000 check on Robert's check register. The check appears to be missing also.

C1: Robert and Linda are the only employees who have been with the department long enough to accrue any vacation time. Robert just returned from a four-day vacation hiking in the Big Bend area. Linda has not taken any vacation for the past two years. She maintains this is necessary because there are so many new employees. Linda does appear to be busy. She is consistently the first to arrive at work each day and the last to leave at night. However, Linda is at the point where she will lose a lot of vacation days, so Stan has insisted that she take vacation. Linda agreed to do this, but takes only one day at a time.

Risk Factors: Absent

A2: Four months ago, Stan asked Linda to develop controls over the accounts payable function for the City. The prior Finance Director had abolished these controls because she thought they were unnecessary. However, Stan knows they are important, so he wants two checks: (1) each accounts payable clerk (Nancy and Robert) to check the other's work, and (2) the senior accountant (Mary) to check the work of both of the accounts payable clerks. Linda designed some controls that met Stan's expectations and the controls have been in place for three months.

B2: Each Tuesday evening, the City runs checks for the invoices that are due that week. Then, on Wednesday morning, the accounts payable clerks verify the amount of each check with the register and also confirm that all supporting documents are attached. After Mary reviews the registers and documentation, the checks are mailed out to the vendors. Mary reviews Nancy's and Robert's work and notes that all checks and supporting documents are accounted for this week.

C2: Robert and Linda are the only employees who have been with the department long enough to accrue any vacation time. Robert just returned from a four-day vacation hiking in the Big Bend area. Linda and her husband spent a week at the beach earlier this year.