

**Indicators of Fraud Detection Proficiency and Their Impact on Auditor Judgments in
Fraud Risk Assessments and Audit Plan Modifications**

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ABSTRACT

The study examines how an individual's level of fraud detection proficiency (an individual possessing formal fraud education or training, informal fraud training, fraud task-specific experience, and /or fraud-related certifications) impacts their performance on fraud risk assessments and modification of audit plans. Further, it explores which of the fraud detection proficiency dimensions are valuable for auditors in situations of high and low levels of fraud risk and how these characteristics interact with professional skepticism. This, as well as the effectiveness and efficiency of the procedures selected, are addressed using a survey-based scenario where one case is embedded with a financial statement fraud and the other is not. Tobit and ordered logit regression models are used to evaluate a sample of 40 auditors and 10 forensic professionals with varying levels of fraud-related experiences, education, training, and certifications against a benchmark panel.

Results demonstrate fraud certifications are effective in fraud risk assessments, are not effective in audit plan modifications, and on average those individuals tend to over-audit. In addition, fraud-related task-specific experience improves audit plan modification effectiveness. Third, including professional skepticism as an interaction is more reflective of the variable's nature, with results supporting interactions with fraud certifications and informal fraud training in the fraud risk assessment model and formal fraud training in the audit plan modifications model. Finally, individuals of higher rank, in addition to those with fraud certifications, are more likely to over-audit, while individuals in the no fraud scenario are more likely to under-audit. This study contributes to the academic literature with regard to a subset of the FJDM proposed

by Hammersley (2011) validating professional skepticism as an integral variable in the model, particularly as an interaction variable and with regard to the impacts of fraud certifications and fraud-related task-specific experience. The study also contributes by providing evidence, which indicate lower fraud risk situations are prone to assessing fraud risk less effectively and under-auditing. Finally, this study also contributes a new measure for direct fraud-related experience, which captures more details regarding applicable task-specific experiences.

DEDICATION

To my best friend, Chris Luke. Without whom, this dissertation would likely still be unfinished. She calmed me down during my mini (and not so mini) freak-outs. She helped motivate me when I was tired and needed a break or a kick in the pants. She made me laugh when all I wanted to do was cry. She believed I was smart and strong when I forgot. She celebrated every success like it was the most fabulous accomplishment in the world. And this one will be no different. Cheers.

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TABLE OF CONTENTS

Chapter One: Introduction	1
1.1 Theory Development and Independent Variables.....	4
1.1.1 Fraud-related Task-specific Experience	5
1.1.2 Professional Skepticism.....	9
1.2 Research Design.....	11
1.3 Findings and Conclusion.....	14
Chapter Two: Background and Related Literature	18
2.1 Conceptual Model.....	18
2.2 Dependent Variables.....	18
2.2.1 Fraud Risk Assessments	18
2.2.2 Audit Plan Modifications.....	25
2.3 Independent Variables	31
2.3.1 Fraud Detection Proficiency	31
2.3.2 Professional Skepticism.....	48
2.3.3 Relationship between Fraud Detection Proficiency and Professional Skepticism ..	54
2.3.4 Relationship between Fraud Detection Proficiency and Over-auditing	54
Chapter Three: Research Methods.....	59
3.1 Research Design.....	59
3.1.1 Participants.....	59
3.1.2 Company Information and Manipulation.....	61

3.1.3 Dependent Variables	63
3.1.4 Independent Variables	64
3.1.5 Control Variables	67
3.1.6 Benchmark Panel	69
3.1.7 Administration of the Experiment	70
3.2 Hypothesis Testing.....	71
3.2.1 Models.....	72
3.2.2 Additional Tests.....	73
3.3 Pre- and Pilot Testing.....	74
3.3.1 Pre-Test #1	74
3.3.2 Pre-test #2	77
3.3.3 Pilot Testing.....	79
3.3.4 Firm Risk Management and Specialized Versions	80
Chapter Four: Analysis and Results.....	82
4.1 Preliminary Analysis.....	82
4.1.1 Demographics and manipulation check	82
4.1.2 Data preparation.....	83
4.1.3 Tests of assumptions and descriptive statistics	85
4.2 Fraud Risk Assessment Model Analyses	88
4.3 Audit Program Modification Models.....	90

4.4 Relationship between Professional Skepticism and Fraud Detection Proficiency	94
4.5 Relationship between Over-auditing and Fraud Detection Proficiency	96
Chapter 5: Discussion and Conclusion	98
5.1 How do Indicators of Fraud Detection Proficiency Impact an Individual’s Ability to Adequately Assess Fraud Risk and Modify Audit Plans?	98
5.1.1 Fraud Risk Assessments	98
5.1.2 Audit Program Modifications	100
5.2 How are Relationships between Fraud Detection Proficiency Indicators and the Ability to Assess Fraud Risk and Modify Audit Plans Impacted by an Auditor’s Professional Skepticism?	102
5.3 What is the Relationship between Fraud Detection Proficiency and Over-Auditing?	104
5.4 Contributions.....	105
5.5 Limitations and Future Research	108
References.....	114
Appendix A. Scenario Background Information	144
Appendix B. Scenario Roll-Forward Procedures and Marketing Plan	147
Appendix C. Scenario Ratios and Financial Statements.....	149
Appendix D. Scenario Dependent Variable Questions.....	150
Appendix E: Independent Variables and Demographic Questions.....	157

LIST OF FIGURES

Figure 1.1 Fraud risk assessment and audit plan modifications FJDM model (modified from Hammersley (2011)) A Review and Model of Auditor Judgments in Fraud-Related Planning Tasks. Auditing: A Journal of Practice and Theory 30 (4): 101-128. Used with permission of Lisa Habblitz, American Accounting Association, 2015.....	122
Figure 4.1. Normal Quantile-Quantile plots	123
Figure 4.2. Linearity, normality, and homoscedasticity tests	124
Figure 4.3. Independence of errors by FIRMTYPE and RANK	125
Figure 4.4. Boxplots of predictor variables for fraud and no fraud samples	126
Figure 4.5. Histogram of FRADIFF variable.....	127
Figure 4.6. Graphs of predictors against empirical logits.....	128
Figure 5.1. Selected graphs of interactions.....	129

LIST OF TABLES

Table 2.1 Topics covered or recommended in courses.....	130
Table 3.1 Variable name, descriptions, and scoring options.....	131
Table 3.2 Panel A. Pre-test #2 descriptive statistics.....	132
Table 3.3 Pilot test manipulation checks.....	133
Table 4.1. Demographic statistics.....	134
Table 4.2. Manipulation checks.....	135
Table 4.3. Summary of exploratory factor analysis of experience and professional skepticism variables.....	136
Table 4.4. Descriptive statistics.....	137
Table 4.5. Pearson correlation table.....	138
Table 4.6. Fraud risk assessment analyses – OLS.....	139
Table 4.7. Audit program modification regression (APGSCORE) – OLS	140
Table 4.8. Interactions between professional skepticism and fraud detection proficiency – FRADIFF model.....	141
Table 4.9. Interactions between professional skepticism and fraud detection proficiency – APGSCORE model.....	142
Table 4.10. Audit program modification over-auditing models.....	143

CHAPTER ONE: INTRODUCTION

Auditors are tasked with providing reasonable assurance as to whether financial statements are free from material misstatements, whether due to fraud or error, and the public expects auditors to discover fraud (Mock et al. 2013). If an audit team fails to recognize fraud risk cues and modify the audit plan to address specific fraud schemes, fraud could go undetected, and the firm could issue an unqualified opinion. On the other hand, auditing for all possible fraud schemes is unrealistic, costly, and potentially leads to over-auditing. This is why we have risk-based audit approaches (Eilifsen et al. 2001) and why academics and the profession continue to research interventions to improve auditor performance in this domain (e.g., Hammersley et al. 2011; Hoffman and Zimbelman 2009). This three-way tension between the public's desire for the discovery of financial statement fraud by auditors, the need for auditors to be effective in their procedures, and the environment of significant budget pressure is a core motivation for this research.

The solution to reducing the expectations gap is elusive. Blindly expanding audit procedures, audit hours, or even bringing in costly forensic specialists¹ for more than a minor advisory role may or may not be economically feasible from the firm's perspective. The first step in the process to improve audit performance is to identify qualities (i.e., indicators of fraud detection proficiency²) of skilled individuals. These individuals should be capable of assessing fraud risks, modifying audit procedures with specific fraud schemes in mind, gathering sufficient

¹ Forensic specialists are individuals who focus on forensic accounting and fraud-related services and can be found internally in a firm's own advisory departments or externally through third-party service providers.

² The indicators of fraud detection proficiency in this study (fraud-related task specific experience, fraud related certifications, formal fraud education (i.e., college courses), formal fraud training (continuing professional education [CPE]), and informal fraud training) are derived from AU Section 210, "*Training and Proficiency of the Independent Auditor*," which requires that audits be "performed by a person or persons having adequate technical training and proficiency as an auditor" (PCAOB 2014c, AU 210.01). It further defines a proficient auditor as one who has the following characteristics with regard to auditing: formal education, experience, technical training, and a "commensurate measure of general education" (PCAOB 2014c, AU 210.03).

evidence with regard to those fraud risks, and determining that risks are addressed. Then the profession can institute specific interventions that allow others to gain proficiency and improve performance as it relates to auditing fraud. This research is guided by the following research questions: *How do indicators of fraud detection proficiency impact an individual's ability to adequately assess fraud risk and modify audit plans? How are these relationships impacted by an auditor's professional skepticism? And finally, is there a relationship between fraud detection proficiency and over-auditing?*

The literature frequently focuses on the impact general audit experience combined with an intervention has on fraud risk assessments and/or audit plan modifications. For example, when examining general audit experience and analytical procedures, Knapp and Knapp (2001) demonstrate managers are more likely than senior associates to assess fraud risk higher (lower) when fraud risk is present (not present). Hammersley et al. (2011) examine how senior associate level general audit experiences impact fraud judgment and decision making (FJDM) in heightened fraud risk situations that contain material weakness information. Other examples include using standard audit programs in higher risk audit engagements (Asare and Wright 2004), evaluating preparer (reviewer) task-specific experience and fraud risk assessment documentation structure (Agoglia et al. 2009), and implementing strategic reasoning (Hoffman and Zimbelman 2009).

These studies add to our understanding regarding the impact of interventions on fraud risk assessments and, to some extent, the ability to modify audit plans in response to those risks. Lack of formal training, limited fraud experiences, and lack of appropriate knowledge (e.g., fraud risk, fraud schemes, sample targeting) are some of the stated reasons for lack of performance in studies for auditors in the standard audit program group (Asare and Wright 2004)

and senior associates (Knapp and Knapp 2001; Hammersley et al. 2011). Others studies show that the auditors perform comparatively better than those without the trait studied. Agoglia et al. (2009) find that preparer and reviewer task-specific experience is able to moderate the effect of fraud risk assessment documentation structure on the ability to identify control weaknesses, which emphasizes the importance of task-specific experience in the fraud risk process.

Further, Hoffman and Zimbelman (2009, 834) find audit managers who use strategic reasoning modify audit plans and assess risk more closely to those of an expert panel than a control group does; however, while similar, the auditors' modifications "do not fully implement the experts' modifications." The authors suggest this could be due to anchoring, experience levels, or the fact that audit managers are not forensic specialists. Studying one possible cause, Boritz et al. (2015) find forensic specialists propose a wider range of additional procedures than auditors, which are marginally more effective but not more efficient than auditors without fraud expertise. Further, results indicate that fraud specialists expect more procedures to be performed within budgeted hours than do auditors. This indicates that fraud specialists may not be as realistic or budget-conscious as auditors. Since Boritz et al. (2015) only evaluate forensic and audit professionals in a high fraud risk situation, comparisons regarding the potential for over-auditing, particularly in a low fraud risk situation (as in this study) have yet to be fully explored.

This study extends prior fraud risk assessment and audit planning research that focuses on general audit experience and more recent research by examining multiple indicators of fraud detection proficiency including fraud-related task-specific experience, fraud-related certifications, formal fraud education (i.e., college courses), formal fraud training (i.e., CPE), and informal training, as well as professional skepticism. Further, ascertaining which indicators of fraud detection proficiency influence fraud judgment and decision making (FJDM) will help

audit firms consider where to focus their resources. Fraud-related task-specific experience is a valuable way to increase fraud detection proficiency. However, not many auditors have opportunities to directly work on audits where fraud is detected or corrected (Loebbecke et al. 1989; Hoffman and Zimbelman 2009; Hammersley et al. 2011). As a result, the profession will need a way to effectively simulate this experience without increasing levels of base-rate neglect (i.e., seeing higher fraud risks in every engagement).

Exploring which indicators of fraud detection proficiency are beneficial for auditors to possess in situations of higher and lower levels of fraud risk will provide insights on whether individuals with certain fraud detection proficiency indicators are prone to over-auditing in lower fraud risk situations. The design of this study also collects and analyzes trait professional skepticism and its interactions with these indicators for a large sample of audit and forensic professionals, ranging from senior associate to partner levels. This provides the profession and standard setters with evidence about which types of individuals self-select into each of these careers, as well as which ones choose to stay and succeed.

1.1 Theory Development and Independent Variables

This dissertation is anchored on the conceptual model of Hammersley (2011), which expects that individual auditor characteristics including fraud-related experience (direct and indirect), problem solving ability, and epistemic motivation lead to knowledge, which influences fraud task performance in the form of FJDM. The model recognizes that situational fraud risk factors also influence fraud task performance. This research argues that successful identification of the individual auditor characteristics of fraud-related experience and professional skepticism impact performance in fraud-related audit planning tasks (Figure 1.1- Grey boxes in bold are the focus of this study.).

[Insert Figure 1.1 here.]

This research lies solidly in the fraud risk assessment and audit plan modification literature within audit judgment and decision-making and brings both auditors and forensic professionals together in the same audit planning study. While this has been done in Boritz et al. (2015), questions remain with regard to the efficiency aspect, which this study incorporates by examining both high and low fraud risk scenarios. This allows for more in-depth comparisons of audit plan modifications and addresses potential over-auditing concerns. Additionally, due to sample size limitations extant literature tends to focus on one or two interventions or indicators; whereas, this study focuses on six, which are described below and in greater detail in Chapter 2.

1.1.1 Fraud-related Task-specific Experience

Previous literature indicates that general audit experience does not always lead to optimal FJDM (Knapp and Knapp 2001; Asare and Wright 2004; Hammersley et al. 2011; Hoffman and Zimbelman 2009). However, individuals with domain-specific experience gain skills that improve as they progress through the ranks (Wright 2001). These skills allow them to identify patterns and develop problem representations, which are useful in assessing risk and designing audit steps to identify the causes of misstatements (Hammersley 2006). In addition, auditors make more accurate fraud detection judgments but do not necessarily pay more attention to evidence when exposed to engagements with intentional material misstatements (Rose 2007). Finally, fraud specialists make a wider range of marginally more effective audit plan modifications than auditors but may be using too many procedures in the budgeted time (Boritz et al. 2015). As such, it is expected that individuals who have detected fraud and/or designed audit programs to detect specific fraud schemes will be more likely to recognize a fraud scheme, assess fraud risk appropriately high, and be better able to develop procedures to detect the fraud

as compared to those without such experiences or exposure. Further, similar types of individuals who are placed in the lower risk scenario are expected to recognize that risks are lower and assess risk as lower; however, they may or may not modify the audit plan in such a manner that does not include unwarranted test work.

1.1.1.1 Fraud-related Certifications

Certifications are one baseline level proficiency indicator with regard to a particular domain. The Certified Public Accountant (CPA) and Chartered Accountant (CA) licenses recognize a minimal level of audit proficiency. Similarly, those with fraud-related certifications (e.g., Certified Fraud Examiner (CFE), Certified in Financial Forensics (CFF), Investigative Forensic Accountant (IFA)) are expected to demonstrate a minimum level of fraud detection proficiency. Requirements to obtain these certifications should be rigorous, necessitating some level of experience and an educational component. The U.S. Uniform CPA and CICA Uniform Evaluation exams cover fraud, internal controls, risk assessments, and fraud risk factors that could result in material misstatements (AICPA website 7/25/2013; AICPA 2011; CICA 2012), but not fraud schemes. For fraud-related certifications, minimum requirements regarding academic and professional standards vary but are also rigorous. To become a CFE, CFF, or IFA licensed practitioner, direct and/or indirect experience in a fraud-related domain, education/training, exam, or CPA/CA license is required (ACFE website 7/23/2013; AICPA website 7/23/2013; Boritz et al. 2015).

Auditors with CPA or CA licenses are responsible for knowledge regarding fraud risk assessments and therefore should be capable of performing as well on fraud risk assessment judgments as individuals with fraud-related certifications. As such, no difference is expected

between public accounting and fraud-related certifications with regard to fraud risk assessments. However, since CPAs and CAs are not tested on their knowledge of fraud schemes and audit plan modifications (AICPA website 7/25/2013; AICPA 2011; CICA 2012), it is unclear if they will exhibit the same level of proficiency in the fraud domain as someone with a fraud-related certification. Therefore, it is expected that individuals with fraud-related certifications will have more effective audit plan modifications than those without such certifications.

1.1.1.2 Fraud-related Education and Training

Failure to perform as hypothesized in a FJDM task may lead to speculation that the participants lack the knowledge or training required to complete the tasks required of them (e.g., Hackenbrack 1993; Hammersley et al. 2011; Asare and Wright 2004; Knapp and Knapp 2001). Auditors can increase their fraud knowledge through training; however, there is a paucity of research on how individuals with forensic accounting coursework and training impact FJDM (Hammersley 2011). Education and training in this study are evaluated in three forms:

- Formal fraud education (forensic accounting or fraud examination courses/degrees offered for credit through universities),
- Formal fraud training (firm training or continuing professional education [CPE] specifically focused on fraud topics), and
- Informal fraud training (gaining knowledge about fraud topics through reading professional articles, magazines, books, or other media).

With regard to formal fraud education, students who learn about fraud cues and professional skepticism over an entire college course are better at detecting fraud than students taught in one class session (Choo and Tan 2000). Similarly, the fraud risk assessments performed

by students who learn through a forensic accounting college course are more in line with an expert panel than those of standard audit students (Carpenter et al. 2011). Based on this, it is expected that individuals who have taken a university forensic accounting or fraud examination course or have otherwise earned a fraud-related degree (e.g., master's, major, minor, certificate in the fraud domain) will make more effective fraud risk assessments than those who have not. Further, fraud examination/forensic accounting courses spend more time covering specific fraud schemes and fraud detection techniques than standard audit courses (Young 2008). This should allow these individuals to identify the specific fraud schemes and subsequently modify audit plans to target these risks more effectively than those individuals who have not had such a class or graduate program.

Firm trainings or other CPE give individuals the opportunity to increase their fraud detection proficiency by expanding their knowledge in the fraud domain. However, not all fraud topics are relevant (e.g., interviewing skills, expert witness) to this study (Cohen et al. 1996; Pope and Ong 2007). As such, while all formal fraud training would be expected to increase fraud detection proficiency, certain types of formal fraud trainings are expected to be more relevant to audit planning activities (e.g., fraud risk assessments, audit planning, and fraud schemes). Therefore, individuals who continue to be trained in these types of topics throughout their careers are expected to be more effective in their FJDM than individuals who do not.

Professional journals, magazine articles, books, and other media on fraud represent an insight into the knowledge structures and thought processes of the academics, professionals, journalists, whistleblowers, and occasional fraudster authors. These forums are an opportunity to learn (informal training) about the fraud domain, particularly as it relates to fraud risks or schemes. Their effect may not be as strong as in formal fraud education or training where

individuals have more opportunities to engage more thoroughly as in live training. However, it is expected that participants with informal fraud training will have received incremental benefits above those without training and will therefore have more effective FJDM than those who seek such training less often.

1.1.2 Professional Skepticism

Professional skepticism is “a multi-dimensional construct that characterizes the propensity of an individual to defer concluding until the evidence provides sufficient support for one alternative/ explanation over others” (Hurtt 2010, 151). Generally speaking, individuals who have higher levels of trait professional skepticism as measured by the Hurtt Professional Skepticism Scale (Hurtt 2010) make judgments that are more skeptical in nature (Hurtt et al. 2012; Popova 2013). In an ambiguous misstatement scenario, students with higher skepticism rate fraud cues as more relevant to their decisions (Popova 2013). Hurtt et al. (2012) find that auditors with higher levels of trait skepticism are more likely to find contradictory information in work papers, whereas less skeptical auditors tend to find more factual errors. Consistent with these findings, it is expected that those with heightened professional skepticism will have more effective fraud risk assessments.

Trait professional skepticism should be enough to raise suspicion and cause auditors to consider changing the audit plan when fraud risk is high. Therefore, individuals with higher levels of professional skepticism will be more likely to increase the extent of audit tests as seen in some prior studies (e.g., Zimbelman 1997; Hammersley et al. 2011; Favere-Marchesi 2013). However, there is nothing inherent within trait professional skepticism that indicates individuals with professional skepticism will modify audit plans more effectively than those with lower

levels of professional skepticism. Therefore, it is expected that there will be no difference among individuals' audit plan modifications due to trait professional skepticism.

1.1.2.1 Relationship between Fraud Detection Proficiency and Professional Skepticism

Nelson's (2009) and Hurtt's (2013) models of professional skepticism are built on incorporating interactions from any of the fraud detection proficiency constructs, as both theorize that not only are auditors' behaviors a function of their traits, but also of the situation they are in. As such, they believe professional skepticism should interact with the evidence provided, educational background, training, certifications, and experiences. However, given the lack of relevant literature, it is not possible to hypothesize all of the possible interactions. Therefore, interactions with the fraud detection proficiency determinants have also been considered herein as an exploratory research question.

It has been suggested that it is possible for an auditor's professional skepticism to be too high in a given situation, leading to inefficiency and potential over-auditing (Hurtt et al. 2012; Nelson 2009). This may be applicable in the no fraud scenario if individuals with higher levels of professional skepticism seem to "see" fraud everywhere. However, neither Hurtt et al. (2013) nor Nelson (2009) indicate what level of professional skepticism would be "too high" nor which types of individuals would most likely fall into this category. This study allows for the evaluation of two fraud risk scenarios by individuals from a variety of firms, job ranks, service lines, and experiences. It provides a unique opportunity to assess the effect of trait professional skepticism has on individuals, their audit planning judgments, and their potential to over-audit.

1.1.2.2 Relationship between Fraud Detection Proficiency and Over-auditing

One potential solution to decrease the expectations gap is to staff all audit engagements with auditors or forensic professionals with higher levels of fraud detection proficiency and professional skepticism. This should increase the fraud discovery rate. However, it may not help alleviate the “[d]istrust, of auditors’ motives, incentives, and judgments” coming from what Palmrose (2009, 286) calls the “404 backlash.” This “backlash” originated from the AS No. 2 implementation costs, and as a result, regulators began looking at efficiency and effectiveness. Consequently, concerns of over-auditing became more prevalent (Palmrose 2009).

Forensic professionals are marginally more effective at proposing a wider range of additional procedures than auditors, which are more effective in a high fraud risk scenario (Boritz et al. 2015). However, with higher billing rates than auditors, forensic professionals have not been evaluated in situations of lower fraud risk to see if the results hold. Further, it is unclear if the greater number of tests assigned by forensic professionals can be performed in the same amount of time allotted by auditors performing fewer, different procedures (Boritz et al. 2015). Both of these issues complicate the evaluation of over-auditing in this study. However, including both high and low fraud risk scenarios allows for post hoc exploratory research regarding this relationship.

1.2 Research Design

This study’s survey-based scenario has one experimental manipulation (fraud versus no fraud). It is based on Asare and Wright’s (2004) and Hammersley et al.’s (2011) instruments. The scenario is adapted from an actual company in the medical products industry that committed financial statement fraud. The company used channel stuffing and bill-and-hold schemes with a small number of their clients. Case information includes company background, controls

information, financial statements, ratios, new marketing program details, and industry information. Auditors can draw specific fraud risk hypotheses from cues included throughout the case materials, but the cues are focused in the financial statements, ratios, and marketing program. The experimental manipulation is whether the financial statements reviewed by the participants contain a seeded intentional material misstatement. As the Hammersley et al. (2011) and Asare and Wright (2004) studies only include a seeded fraud scenario, this instrument was modified to construct a no fraud version based on the restated financial statements.

All participants were assigned as the lead auditor of this engagement and were responsible for updating the revenue cycle audit program for the medical products company. Everyone received the same information regarding the description of the industry, historical company, management, control environment, and revenue cycle. Participants were told that “computer and manual controls over processing of routine revenue transactions are in place and effective.” They were also informed that during planning, risk assessments were performed for revenue, and the preliminary assessment was moderate for inherent and fraud risk and low for control risk. This represents a substantial modification from the Asare and Wright (2004) and Hammersley et al. (2011) instruments. Their cases put participants in the planning phase of the audit, whereas this study places participants in the middle of the audit, where planning procedures have already been performed. After receiving revenue cycle information, the participants received information about the roll-forward procedures and a newly implemented marketing plan. The main differences between the seeded fraud (no seeded fraud) versions are the dollar amount, timing of the new marketing program, and distributor financing arrangements.

After reviewing all of the case information, participants were first asked to list any risk factors and perform the fraud risk assessment. The final audit task was to update the revenue

cycle audit program. For each of the standard procedures provided, participants were asked to choose one of five options, based on the risks at the company. The options include: (1) omit the procedure as non-applicable; (2) perform the standard procedure and conduct a random sample; (3) increase the sample size due to high risk (i.e., increase extent) and indicate by what percentage to increase; (4) modify the sample to focus or target a particular segment of the population and indicate what percentage of the sample should focus on that group; (5) modify the sample in some other way. To establish the FJDM quality, the main measures (fraud risk assessment and audit program modifications) are based on comparisons to a panel that convened to arrive at consensus benchmark answers for both versions of the case study.³

Since proficiency cannot be manipulated, level of fraud detection proficiency was evaluated by measuring the individual determinants of proficiency (i.e., certification, formal education, formal training, informal training, and task-specific experience). This represents a significant contribution of this study. To the author's knowledge, no other research clearly defines or measures fraud detection proficiency. This study aims to develop improved measures that can be used in future academic research and help audit firms determine where to focus their resources. Professional skepticism is measured using Hurtt's (2010) scale.

A Tobit multiple regression model was originally planned to analyze the results for the dependent variable FRADIFF, which is the absolute value of the difference between the participant's fraud risk assessment and the expert panel's assessment. A Tobit model would be appropriate in this study because both dependent variables have upper and lower limits,⁴ and

³ The benchmark panel is made up of four (4) individuals, two (2) Big4 audit partners, one (1) former Big4 forensic professional, and one (1) academic professor who teaches auditing and forensic accounting courses. Further discussion regarding the benchmark panel can be found in subsection 3.1.6 Benchmark Panel and in 3.2 Hypothesis Testing.

⁴ FRADIFF has a potential range of zero (0) to ten (10).

using Ordinary Least Squares could potentially introduce bias in the coefficients. An ordered-logit model was initially planned to analyze the results for APGSCORE due to the ordinal nature of the variable. APGSCORE is the cumulative number of audit program guide (APG) procedures the participant chooses that matches the set of procedures selected by the benchmark panel. The final score range resulted in a fraud (no fraud) possible score of 14 (12).

The study includes 41 auditors and 10 forensic professionals. These individuals range from senior associates to partners and come from a mix of firms (small, mid-tier, and Big4). To assist in determining which proficiency characteristics are important, the sample consists of auditors with varying levels of fraud skills, training, and experiences. A portion of the sample includes individuals with certifications such as the CFE or CFF and those who have participated in fraud-related CPE. The sample includes individuals from a range of firms (local/regional, mid-sized, Big4) to determine whether differences in firm resources may have an impact. To address the importance of task-specific experience, there are also individuals who are designated fraud specialists (i.e., forensic consultants), as well as auditors with and without direct fraud detection and/or financial statement restatement experience. Finally, participants come from a range of positions (e.g., experienced senior associates, managers, senior managers, partners) to establish whether differences are due to general audit experiences gained throughout a career.

1.3 Findings and Conclusion

When compared to the mean judgments of a benchmark panel, the overall results suggest individuals who possess indicators of fraud detection proficiency are not more effective in assessing fraud risk and modifying audit plans. Professional skepticism followed by fraud certifications are most beneficial in producing effective fraud risk assessment judgments. However, individuals with higher levels of informal fraud training are less effective in assessing

fraud risk. When factoring in potential interactions with professional skepticism, higher levels of professional skepticism enhances the fraud risk assessment effectiveness of individuals with fraud certifications. In addition, in the FRADIFF model higher levels of informal fraud training hinder or higher levels of professional skepticism impact risk assessment effectiveness as before, along with a moderately significant interaction effect.

Individuals with fraud-related task-specific experience are on average more effective at modifying audit plans and is the only variable found to significantly increase effectiveness. The remainder of the fraud detection proficiency variables either do not register an impact in this sample or they negatively impact audit plan modification effectiveness. Increases in either fraud certifications, industry specialization, or audit-related task specific experience provide decreases in effectiveness in audit plan modifications. However, evaluation of the relationship between the indicators of fraud detection proficiency and professional skepticism add additional insights. When interactions are taken into consideration, fraud-related task-specific experience, industry specialization, and audit-related task-specific experience are still associated with more effective audit plans. However, the formal fraud training*professional skepticism interaction term presents a unique look at how CPE can compensate for lower levels of professional skepticism and vice versa. However, it also warns of the danger of having too much or too little of both. Individuals with higher levels of CPE and higher levels of professional skepticism are expected to have lower levels of audit plan modification effectiveness, as are those individuals with lower levels of CPE and professional skepticism. Finally, results indicate in higher risk situations individuals with a fraud certification are more likely to over-audit.

This study contributes to the academic literature by providing evidence with regard to a subset of the fraud judgment and decision making model proposed by Hammersley (2011) in a

number of ways. First, results indicate that professional skepticism is an integral variable in improving fraud risk assessment effectiveness and particularly as an interaction variable. In addition, the limited impacts by the fraud detection proficiency variables provide further insights to the model, including showing the impact fraud certifications appear to be effective at assessing fraud risk, while at the same time leading to over-auditing. Second, fraud-related task-specific experience is key to determining audit plan modification effectiveness. Third, the study contributes by evaluating Hammersley's (2011) model using individuals with extensive professional experience with the majority of individuals at or above the manager level and having more than 6 years of audit or fraud experience. Fourth, the study contributes to Hammersley's (2011) study by evaluating both higher and lower risk fraud risk scenarios as results indicate lower fraud risk situations are prone to assessing fraud risk less effectively and under-auditing. Finally, this study also contributes a new measure for direct fraud-related experience, which captures more details regarding applicable task-specific experiences than a generic year experience proxy used in many studies (e.g., Rose 2007; Hammersley et al. 2011).

This study also opens avenues for future research. Fraud-related task-specific experience is noted to have mixed results. It is associated with audit program modification effectiveness but not in fraud risk assessments. Researchers should evaluate whether it is possible to replicate that experience through training without inducing base-rate neglect problems. Also, further research should explore whether the beneficial effects of fraud detection proficiency are equally important in the revision of those audit plans once new evidence comes to light during audit fieldwork. This study focuses on external characteristics or interventions that can be influenced by firms or colleges to improve fraud detection proficiency. However, there are also internal characteristics

and traits that should be explored. For example, what inherent traits lead individuals to self-select into a career in forensic accounting rather than a career in auditing?

The rest of this dissertation is organized as follows. Chapter two provides a summary of the existing academic literature and develops the hypotheses to be tested. Chapter three describes the research methodology including the instrument design, participants, and measures of the independent and dependent variables of interest. Chapter four includes the data analysis of all of the results including descriptive statistics, tests of hypotheses, and any post hoc analysis performed. Chapter five provides concluding remarks including summary discussion of the results, contributions, limitations, and future research.

CHAPTER TWO: BACKGROUND AND RELATED LITERATURE

This chapter explores the relevant academic literature for supporting the proposed conceptual model used in answering the research questions of this study. It also presents the hypotheses to be tested herein.

2.1 Conceptual Model

This study is anchored in the conceptual model of Hammersley (2011), which expects that individual auditor characteristics including fraud-related experience (direct and indirect), problem solving ability, and epistemic motivation lead to knowledge. These constructs then influence fraud task performance in the form of fraud judgment and decision making (FJDM). The model recognizes that situational fraud risk factors also influence fraud task performance. This research argues that the individual auditor characteristics of fraud-related experience and professional skepticism impact performance in fraud-related audit planning tasks.

This chapter will first discuss the extant literature of common planning tasks including fraud risk assessments and audit plan modifications (subsections 2.2.1-2.2.2). The next subsections will discuss fraud detection proficiency (which expands Hammersley's (2011) experience [direct and indirect] in to the constructs fraud-related task-specific experience, formal education, certifications, formal training, and informal training) and professional skepticism (subsections 2.3.1-2.3.2). See the conceptual model at Figure 1.1 in Chapter 1, wherein bolded grey boxes are the focus of this study.

2.2 Dependent Variables

2.2.1 Fraud Risk Assessments

Originally effective in 1997 as a result of SAS No. 82 and reemphasized by SAS No. 99 (AU 316) in 2002, fraud risk assessments are an integral part of the audit process. However, the

Public Company Accounting Oversight Board (PCAOB) (2007a) still occasionally finds that audits fail to collect sufficient evidence regarding recognized and/or recognizable fraud risks. Therefore, understanding how to improve auditor judgments regarding fraud risk assessments and determining what interventions can be put in place to improve the assessment process are important to the profession. Generally speaking, it is thought that auditors who are capable of identifying and hypothesizing how specific fraud schemes could be perpetrated should be able to reflect this knowledge through effective fraud risk assessments (Hammersley 2011).

In research, fraud risk assessments are examined mainly from situation variables rather than person-oriented variable perspectives. For example, the literature focuses on the value of decision aids and how the intervention of a particular type of decision aid can improve or hinder auditor judgments in fraud risk assessments. Eining et al. (1997, 5) find that auditors who use an expert system decision aid that includes “constructive dialogue” are better able to discriminate between scenarios with differing risk levels than those who use only a logit model or no decision aid at all. Bell and Carcello (2000) use known fraud and assumed no fraud companies to develop a logistic model to test against the fraud risk assessments performed by auditors. They find that a logistic model outperforms auditors in cases of fraud when using the existence or non-existence of six generic red flags, but the authors find no difference for no fraud cases. Asare and Wright (2004) find that in a seeded fraud case scenario, auditors without a checklist provided to them assess fraud risk higher than those with a checklist.⁵ Finally, Rose et al. (2012) show that fraud risk assessments performed by novices (i.e., students) will be more like fraud experts’ risk

⁵ However, without a non-fraud case as a baseline comparison, we have no basis to see whether auditors without checklists also appropriately assess fraud risk lower when fraud risk is lower. Carpenter and Reimers (2013) use fraud and no fraud scenarios to show that auditors can rate fraud risk lower in a no fraud scenario versus a fraud scenario, but checklists are not a manipulation used in this study.

assessments if they are provided with tools (i.e., decision aid based on experts' knowledge structure versus SAS No. 99 standard checklist) that are designed to facilitate the knowledge structure needed for the task at hand.

The fraud risk assessment literature also looks at situations where brainstorming in groups leads to higher fraud risk assessments than individual assessments (Carpenter 2007; Lynch et al. 2009). Auditing Standard No. 12 (AS No. 12) requires a discussion about the risk of material misstatement due to fraud be conducted with key members of the engagement team as a part of the planning process (PCAOB 2010, AS No. 12). It is during these sessions that the audit team comes together to brainstorm fraud risks and ways that the client might perpetrate fraud. Based on this discussion and other planning activities (which may be conducted by individual auditors and reviewed by others), audit procedures are formed to adequately address each of the identified fraud risks.⁶

Another stream of fraud risk assessment literature looks at auditor interventions directed toward auditors using more holistic or various decomposition approaches. For example, auditors who assess fraud risk separately, as required by SAS No. 82, using a decomposition method spent more time reading red-flag clues (Zimbelman 1997). Further, auditors who are asked to rate risk of financial statement fraud due to incentives, opportunities, and attitude before giving their overall fraud risk assessment (i.e., decomposition group) are more sensitive when fraud risks are low, but both groups assess fraud risk higher when risk is high (Wilks and Zimbelman

⁶ This study asked individuals to assess fraud risk and recommend changes to the standard audit procedures mid-audit after planning procedures including the initial brainstorming session and preliminary risk assessments had been performed. While Carpenter (2007) finds brainstorming audit teams produce fewer but higher quality fraud ideas and higher levels of assessed fraud risk than what individuals identify on their own, this study uses an individual auditor design. As a result, it is suspected that individuals will have lower fraud risk assessments, which may bias against the study's results.

2004). Favere-Marchesi (2013) extends Wilks and Zimbelman (2004) by looking at whether this difference is due to the decomposition of fraud risk assessments (i.e., actually assessing risks) or whether the same results are achieved by merely categorizing the risks before doing the overall fraud risk assessment. Results confirm auditors in the decomposition group are more sensitive to changes in incentives and opportunity cues, leading to higher fraud risk assessments than the categorization only group (Favere-Marchesi 2013).

The three previous paragraphs capture information regarding interventions that are meant to change the situation in which the auditor is performing the fraud risk assessment (e.g., decision aid/no decision aid, group/individual, holistic/decomposition) and do provide valuable insights. In many of these situations, auditor performance is better aligned with researchers' expectations. Sometimes, auditors discriminate better (Eining et al. 1997), assess fraud risk higher (e.g., Asare and Wright 2004; Lynch et al. 2009; Wilks and Zimbelman 2004; Favere-Marchesi 2013), or provide assessments that are more expert-like (Rose et al. 2012); sometimes, computers outperform human auditors but also falsely accuse innocent companies (Bell and Carcello 2000). Some of these findings result from research design choice limitations. If research only uses one scenario where fraud risk is ambiguous or high risk, the analysis can only evaluate how auditors evaluate risk in comparison to other auditors but not with regard to effectiveness or some other benchmark. In other studies, auditor performance can be evaluated based on some relative benchmark performance either based on how the scenario(s) is/are designed (Eining et al. 1997; Bell and Carcello 2000; Carpenter 2007) or by comparing participant responses to expert panel responses (Rose et al. 2012). What has been learned from the literature reviewed thus far is that given certain interventions in particular situations, auditors

make decent fraud risk assessments. Sometimes, those assessments are in line with expectations, but sometimes, there is no baseline against which to compare them.

In another example, the audit literature examines how auditors react in a scenario where a “type of evidence” intervention is put in place. Trotman and Wright (2012) evaluate how auditors use evidence from both internal sources (prone to easier manipulation) and an external source (less prone to manipulation). They find that in situations where evidence from internal sources is mixed, fraud risk assessments are more likely to be influenced by external evidence. Therefore, where the external evidence indicates lower (higher) risk, fraud risk assessments are lower (higher). However, in situations where evidence from internal sources indicates low fraud risk and where external evidence indicates high fraud risk, assessments are not impacted. Thus, where contrary external evidence should be most useful, it is disregarded, potentially indicating a lack of heightened professional skepticism that would ordinarily be expected.

The mixed results indicate there may be some person-oriented variable gap, such as general audit experience,⁷ that can explain the variability in risk assessment judgments. When looking into how auditors rated 16 various fraud risk “red flags,” Hackenbrack (1993) notes that auditors disagree about “red flags” impacts on fraud risk (experiment 1). However, upon further exploration (experiment 2), auditor experience with clients of different sizes seems to explain some of that variation - those staffed on large clients emphasize opportunity flags more than those staffed on smaller clients. Managers are more likely to assess fraud risk higher in the fraud scenario and lower in the no fraud scenario than senior associates when asked to assess risk after performing analytic procedures (Knapp and Knapp 2001). But when told that the purpose of

⁷ In many of these studies, general audit experience is measured as title rank or number of years as an auditor.

performing analytical procedures is to perform the fraud risk assessment, both managers and senior associates perform more in line with expectations than those told only to perform analytical procedures. The authors interpret these results to indicate that senior associates may not have enough experience to make them qualified to perform fraud risk assessments. In a more recent study, Hammersley et al. (2011) find that senior associates can appropriately assess fraud risk as high in certain situations. In the treatment condition where a material weakness is present, senior associates assess fraud risk higher. However, this does not cause them to generate more fraud risk hypotheses than seniors in the condition where no material weakness exists. This is contrary to the expectation that a number of hypotheses would be generated in both groups, as each group is given a seeded fraud scenario.

These three studies (Hackenbrack 1993; Knapp and Knapp 2001; Hammersley et al. 2011) illustrate that performance on fraud risk assessments can be impacted not only by situational interventions such as altering the decision aid availability, group involvement, decomposition, and evidence source, but also by the type of auditor performing the assessment. The problem is that these studies do not explore characteristics unique to these individuals other than job title or client size. This study contributes to the literature by focusing on other aspects unique to the auditor with respect to fraud detection proficiency (e.g., task-specific experience, education, certification, and training) and professional skepticism that leads to higher fraud risk assessment effectiveness.

2.2.1.1 Fraud Risk Hypothesis Generation

The first step in detecting fraud is to appropriately assess fraud risk. Hypothesis generation is a key step in any successful fraud risk assessment, regardless of situational

interventions or individual auditor traits (Hammersley 2011). Hammersley's (2011) model describes hypothesis generation as an iterative process where an auditor identifies risks and generates hypotheses on how fraud could be committed. Assessing fraud risk is a function of not only adequately identifying the red flags, but also using those red flags to generate hypotheses about how those red flags might be translated into potential fraud schemes used by perpetrators. This way, the auditors can assess fraud risk and adequately address those risks throughout the audit. An auditor's ability to perform these tasks depends on the types of risk present (general versus specific), as well as the auditor's fraud domain knowledge and "mental representations."⁸

Generic risks are usually made up of red flags from the fraud triangle (i.e., incentives/pressures, perceived opportunities, and attitude/rationalization). These factors do not say how the fraud is potentially being perpetrated, and thus do not allow for specific hypotheses to be generated. This ultimately makes it extremely difficult to adequately modify the nature of the audit procedures to address the fraud risk (Hammersley 2011). Much of the early fraud risk assessment research tended to focus on generic fraud triangle cues (e.g., Pincus 1989; Hackenbrack 1993; Zimelman 1997; Bell and Carcello 2000; Apostolou et al. 2001; Glover et al. 2003). Since it is important for the participants in this study to be able to generate hypotheses about the specific fraud risks and schemes to generate audit plan modifications, further discussion of generic risk research is not relevant to this research.

Specific fraud risks, on the other hand, are made up of client-specific information that can be used to determine how potential fraud is likely to be committed. This allows for hypothesis generation and is more likely to lead to enhanced performance on FJDM tasks. Hammersley

⁸ A mental representation is a model within the brain that the auditor compares to and modifies to fit the fraud risks on hand to determine what the hypotheses should be (Hammersley 2011).

(2011) expects auditors with better mental representations will identify patterns and develop hypotheses about how the fraud is occurring. She also notes that hypothesis generation is important for risk identification and assessment. Examples of these types of studies have been discussed earlier, such as Asare and Wright (2004) who find that auditors that are not provided a checklist based on SAS No. 82 risk categories rate fraud risk higher than those who are and Hammersley et al. (2011) who find that auditors in the material weakness condition assess fraud risk higher but do not generate more fraud risk hypotheses than those where no material weakness exists.

Many of the studies that contain enough client information for participants to generate specific fraud risk hypotheses have been designed so that researchers can analyze not only how auditors assess fraud risk but also how they modify audit plans (e.g., Asare and Wright 2004; Hammersley et al. 2011; Hoffman and Zimbelman 2009). Appropriately assessing fraud risk is the first step in adequately planning an engagement with respect to fraud. Hammersley (2011) speculates that auditors may not adjust the audit plan appropriately if they do not adequately recognize the cues indicating increased fraud risk. However, appropriately assessing fraud risk is not the only step. Just because an auditor increases the evaluated level of fraud risk, does not imply that the modifications that follow will be effective in detecting the fraud.

2.2.2 Audit Plan Modifications

In order to appropriately modify the audit plan, an auditor must be able to identify the specific fraud risk, determine whether the standard procedures will or will not be adequate to address the risk, and recognize how to change the program to detect that particular fraud scheme. Some studies, like this one, attempt to understand the process auditors go through to modify the audit plan through the use of a controlled experiment. Others examine actual firm working

papers to try to understand the correlations between fraud risk and audit procedures.⁹ Mock and Wright (1993) find that 95% of audit engagements use standard audit programs and use approximately the same procedures each year. Starting with the client acceptance process, Johnstone and Bedard (2001) find higher fraud risk results in higher fees, higher intentions to increase specialized personnel, and increases in the review process, but no changes in planned hours. Three other studies show mixed results, with one that indicates no difference in procedures regardless of risk (Mock and Turner 2005), one that finds review and inquiry is the main solution for addressing fraud risk (Graham and Bedard 2003), and another that finds that increased levels of risk leads to intentions to increase levels of external evidence collection and more testing closer to year end (Blay et al. 2007).

Hammersley (2011) also hypothesizes that auditors with direct and indirect fraud experience, epistemic motivation, and problem solving abilities will be able to modify the audit plan in response to specific fraud risks but does not hypothesize which of these characteristics will contribute most to this performance. Many of the studies that evaluate audit plan modification do so using a scenario with a seeded fraud embedded. This gives researchers the opportunity to build a scenario using actual facts from the fraud scheme (while disguising the company) from court case documentation or the U.S. Securities and Exchange Commission (SEC) Accounting and Auditing Enforcement Releases (AAERs).

Asare and Wright (2004) develop such a case based on a medical products company that committed a revenue-based channel stuffing and bill-and-hold fraud schemes in the early 1990s. The study determines the impact on an auditor's design or finalization of an audit program when

⁹ Note: The data from each of these studies was collected prior to the implementation of the Sarbanes-Oxley Act (SOX) of 2002.

the auditor was given a standard audit program as their guide. Using auditors from three (3) large international firms with an average of 9.7 years of experience, Asare and Wright (2004) find that both seniors and managers create less effective modifications when asked to modify a standard audit program guide than when asked to develop procedures without the guide. Auditors are aware of the need to modify the extent and nature of procedures and to not use the same procedures every year; however, due to the efficiencies gained and to ensure quality and proven procedures are being used, standard programs are frequently used as a starting point (Asare and Wright 2004) and are likely to remain so. Therefore, this is a constraint researchers and the profession need to work within when trying to arrive at solutions that improve auditor effectiveness in the audit plan modification area.

This next study also uses a seeded fraud in the medical products industry to see how auditors change the nature of their audit procedures in response to high fraud risks but has a couple of interesting twists (Hoffman and Zimbelman 2009). First, the auditors are put in situational manipulations that examine the impacts of strategic reasoning¹⁰ (strategic versus non-strategic) and brainstorming (group versus individual). Second, this study attempts to compare the performance of the participants to recommendations of an expert panel and calculates those differences in an interactive manner through the experiment interface. Results show that both brainstorming and strategic reasoning groups are more effective at modifications than the control group.¹¹ However, results also indicate that neither group fully implements all of the procedures

¹⁰ An auditor engaging in strategic reasoning in a fraud context might ask themselves things like: how could a fraud be committed, how could management try to conceal the fraud from the audit team, and how might the audit plan be modified to detect the fraud scheme? All of these topics might be discussed during a brainstorming meeting (Hoffman and Zimbelman 2009).

¹¹ Since AS No. 12 requires brainstorming, strategic reasoning will not be included as a possible auditor characteristic that may increase FJDM in this study.

recommended by the expert panel. This may indicate that even at the manager level, the characteristic general audit experience is not the only person-oriented variable we should be evaluating in audit plan modification of high fraud risk scenarios.

In many public accounting firms, senior associates take on much of the audit planning responsibility. In response, Hammersley et al. (2011) seek to learn how well senior associates modify audit plans in a heightened fraud risk scenario that gives them the opportunity to generate hypotheses. Hammersley et al. modified the Asare and Wright (2004) case background to include information conducive to a post-SOX environment by manipulating an internal control material weakness. Further, the data collection portion of the instrument differs from Asare and Wright (2004), as there is no checklist manipulation, and everyone is provided a program guide.¹² Results indicate that senior associates recommend changes in the extent (i.e., increases in sample size) but do not recommend targeted samples or procedures (i.e., nature) when provided a scenario that should allow them to generate specific hypotheses. This is consistent with the idea discussed above. General audit experience should not be the only proficiency characteristic we evaluate in individuals who make audit plan modifications in high fraud risk situations.

In each of the previous studies (Asare and Wright 2004; Hoffman and Zimbelman 2009; Hammersley et al. 2011), auditors' FJDM is the focus in situations of high fraud risk. However, most auditors have little or no direct experience working on an engagement where fraud has been detected (e.g., Loebbecke et al. 1989; Rose 2007; Hammersley et al. 2011; Gold et al. 2012). As

¹² The standard program format is also different. Possible modifications to standard audit program include 1-omit, 2-perform standard procedure, 3-increase sample size, 4-modify to focus target sample, and 5-modify in some other way. If the auditor chooses 4 or 5, he/she is asked to explain. Auditors are also given the option to write in additional procedures as needed.

a result, some papers have examined how individuals with more direct fraud detection experience, such as the audit firm's forensic specialists,¹³ might benefit the process either by testing auditors' likelihood of consulting with fraud specialists (Gold et al. 2012; Asare and Wright 2004) or by comparing audit program designs completed by auditors and forensic specialists in situations of high fraud risks (Boritz et al. 2015).

The purpose of the Boritz et al. (2015) experiment is to explore whether fraud specialists are more effective at modifying audit plans in response to higher levels of fraud risk than are auditors. This scenario uses a seeded fraud and is a modified version of Asare and Wright (2004). Using a sample of 32 fraud specialists and 16 auditors including managers, senior managers, and partners, the authors find that forensic specialists choose a wider range of additional procedures that are marginally more effective at detecting the fraud scheme within the experimental scenario. According to the authors, the auditors have no "specialized" fraud experience, but there is no information indicating whether these auditors have ever worked on any audit engagements where a material financial statement fraud has been detected.

At first glance, this study seems to imply that auditors are not adept at modifying audit plans in situations of high fraud risk. This may be true; after all, many auditors have not had the opportunities or training that forensic specialists have had in this domain. However, the other thing that remains to be seen and is lacking in each of the studies discussed above, is how auditors or forensic specialists react in the lower risk, no fraud scenario. Auditors are much more prepared for this type of situation, as this is the majority of what they encounter on a day-to-day basis. Likewise, forensic specialists are much less prepared for this scenario, as they are less

¹³ In this study, the term specialist is used to refer to an individual who works in one of the audit firm's consulting divisions, e.g., forensic, internal audit, information technology audit.

likely to encounter lower fraud risk scenarios in their day-to-day engagements. It is important to evaluate high fraud risk scenarios to ensure that the participants modify and increase procedures to detect any hypothesized fraud schemes. However, it is just as important to evaluate the low fraud risk scenarios to ensure that participants modify and decrease procedures to ensure that concerns of over-auditing¹⁴ and budget efficiency are addressed.

Another issue is that each of the above studies contains specific fraud risk cues where Hammersley (2011) expects that auditors will change the nature of planned audit procedures (i.e., target the sample or procedure to address the specific fraud scheme). However, as seen, extant audit plan modification literature indicates that auditors have room for improvement when modifying audit plans to adequately detect specific fraud schemes in high risk scenarios (e.g., Asare and Wright 2004; Hoffman and Zimbelman 2009; Hammersley et al. 2011; Boritz et al. 2015). Many times participants recognize the increased risk and choose to increase the extent of testing (e.g., increase hours or sample size), but they still struggle with modifying the nature of the procedures (i.e., targeting samples or procedures to detect fraud scheme(s) based on the hypotheses generated). Even with Hoffman and Zimbelman (2009), there is still a gap between the experts' benchmark audit program and the participants' judgments.

These findings do not mean that Hammersley (2011) is incorrect in her hypothesis. The characteristics she speaks of, experience, epistemic motivation (professional skepticism in this study), and problem solving ability are traits that many audit firms look for in the auditors they hire.¹⁵ Perhaps researchers expect the majority of these auditors possess these characteristics

¹⁴ Over-auditing in this study is defined as “expend[ing] more audit effort than is required to reduce the uncertainty about misstatements in the auditee’s financial statements to the level that is appropriate for the auditee” (Causholli and Knechel 2012, 632). In practice, it usually has a negative connotation and is avoided where possible.

¹⁵ Examples from two Big4 firm job postings on www.linkedin.com as of 07/07/2013. “Collaborate to plan engagement objectives and an audit strategy that complies with professional standards and appropriately addresses

when they are included in their samples. The extant literature does not separate out the samples based on these characteristics. So it remains an open question as to whether auditors with these characteristics are capable of adequately modifying audit plans in response to fraud risk.

Hammersley (2011) concludes that without specific situation interventions, auditors are not effective at modifying audit plans in situations containing specific cue situations and questions whether this is due to the hypothesized auditor characteristics. She believes that most auditors can recognize fraud risk and may recognize that some extra work needs to be performed, but they are not able to turn that into an audit program prepared to detect the specific fraud risks identified. She recommends future research to determine whether the lack of some auditor characteristics is the reason for this inability. This study intends to answer part of this question by looking at some key fraud detection proficiency determinants and professional skepticism.

2.3 Independent Variables

2.3.1 Fraud Detection Proficiency

The auditing standards require that audits are “performed by a person or persons having adequate technical training and proficiency as an auditor” (PCAOB 2014c, AU 210.01). A proficient auditor is a person who has the following characteristics with regard to auditing: formal education, experience, technical training, and “commensurate measure of general education” (PCAOB 2014c, AU 210.03). These characteristics as well as the Certified Public Accountant (CPA) license¹⁶ can be considered individual indicators or factors of general audit proficiency.

risk” “The [Big4 Firm] approach includes understanding a client's business, the risks it faces, its internal controls, and assessing the risk of material misstatement of the financials in order to design effective audit procedures.”

¹⁶ This can be any nationally-recognized license or certification, which represents a certain base level of audit proficiency. In the case of the CPA, each individual is tested on audit related material, and only CPAs are allowed to certify a company's financial statements.

Within the fraud domain, Trompeter et al. (2013, 301) argue that “it is helpful for the auditor to understand the most common techniques of fraudulent financial reporting.” As such, this study will evaluate how auditors have the opportunity to learn and gain proficiency in the fraud detection domain through direct fraud-related engagement experience, formal education, acquisition of fraud-related certifications, formal training, and informal training. This proficiency should lead them to make more effective fraud planning judgments and decisions.

2.3.1.1 Fraud-Related Task-Specific Experience

2.3.1.1.1 General Task-Specific Experience

Prior to Bonner (1990), many accounting studies did not consider the potential impact of task-specific experience on auditor judgments. Task-specific experience improves auditor judgments in certain situations such as cue selection and weighting for analytical procedure risk assessments (Bonner 1990) as well as in atypical item recall and item recall clustering related to going concern engagements (Choo and Trotman 1991). In addition, Wright (2001) finds that auditors reach higher levels of consensus for loan loss judgments (i.e., performing more like an expert panel).

Agoglia et al. (2009) evaluate the effect of document structure type on a reviewer’s ability to identify a control weakness. The authors find that the weakest documentation structure is the component structure, but that this is moderated when the preparer has task-specific experience in performing control environment assessments. Further, prior task-specific experience reviewing control environment assessments moderates the effect of documentation structure on control assessments. This is important due to prior findings, which caution about potential “flow-through” reviewer effects (Ricchiute 1999).

2.3.1.1.2 Domain-Related Task-Specific Experience

As seen above, general task-specific experience is a key variable in several judgment and decision-making studies. Furthermore, general task-specific experience can be learned in one domain (e.g., industry) and then transferred then to another (Thibodeau 2003). Domain task-specific experience research, specifically that of industry specialists, generally finds that industry specialization improves performance (e.g., Owghoso et al. 2002; Solomon et al. 1999; Taylor 2000; Low 2004; Hammersley 2006). This is anecdotally supported by the fact that public accounting firms have been organized by industry specialty for a number of years. For example, Owghoso et al.'s (2002) findings support the current accounting firm organizational review structure, as seniors typically find more mechanical errors and managers more conceptual errors, but only when working the experimental case in their own industry.

Domain-related task-specific experience, such as industry specialization, also has an impact on inherent (Taylor 2000) and audit (Low 2004) risk assessments. When evaluating a banking industry-specific account versus a non-banking industry-related account, non-specialists were less confident about their risk assessments, and for most assertions, they rated inherent risk higher than did specialists for the industry-specific account (Taylor 2000). Low (2004) demonstrates that when risk is higher (lower) industry specialists assess audit risk higher (lower). In addition, specialists change the nature of their audit program and budget more than non-specialists (Low 2004). Finally, a panel of senior managers and partners reviewed a selection of audit programs, and the quality programs designed by industry specialists are perceived as being of higher quality than programs designed by those who are not specialists. These studies support the idea that individuals with domain-related experience are more likely to assess risk and modify audit plans more effectively.

Domain-related task-specific experience appears to be particularly useful in situations of seeded misstatements. Hammersley (2006) focuses on industry specialization and the ability to recognize and interpret patterns within incomplete cues of a seeded misstatement. She finds that industry specialists assess risk higher and are able to better fill in the gaps and develop problem representations, whereas non-industry specialists are not. Furthermore, Hammersley (2006) notes that even when provided with complete cue patterns, non-specialists struggle to see the seeded misstatement.

Both general audit task-specific experience and domain-related task-specific experience can improve auditor performance. In many studies, researchers focused on either task-specific experience or industry-based (i.e., domain) experience, but not which is more important. Since auditors gain industry experience by working on audit tasks for clients within an industry and vice-versa, the relative importance of each has not been evaluated. Moroney and Carey (2011) use non-specialist auditors (i.e., auditors who have not worked on an engagement involving the audit task or industry involved in the study) to evaluate the relative importance of industry versus task-based experience and find industry-based experience to be relatively more important. Further, the authors find that auditors' performance increases even with small amounts of industry-specific focus annually. However, this experience levels out once auditors spend approximately 20% of their annual time in that industry. This indicates that one may not need to be a full time fraud specialist to derive benefits and knowledge from direct fraud experience.

2.3.1.1.3 Fraud-Related Task-Specific Experience

The level of general audit experience can also affect performance on fraud planning activities. When examining the differences between classes of auditors, managers are more likely

than senior associates to differentiate between high and low levels of fraud risk (i.e., rate fraud risk higher in seeded fraud and lower in a no fraud) in an analytical procedures scenario (Knapp and Knapp 2001). The fraud risk assessments of senior associates are not significantly different whether or not fraud is present, although risk assessments are more in line with expectations when participants are told they are performing analytical procedures for the purpose of doing a fraud risk assessment. Knapp and Knapp (2001, 35) speculate that this may be due to seniors lacking the “requisite knowledge for the task of fraud detection.”

Another study with a seeded fraud finds that senior associates can appropriately assess fraud risk when a material weakness is present, but they do not generate more fraud risk hypotheses than when no weakness exists (Hammersley et al. 2011). Further, senior associates recognize a need to increase the amount of work by recommending changes in the extent of procedures (i.e., increases in sample size) but tend not to recommend changes to target specific samples or procedures (i.e., nature of procedures). This is consistent with the idea that senior associates with general audit experience are generally not qualified to make audit plan modifications in high fraud risk situations, as these changes will not target the specific fraud scheme within the case scenario.

Hoffman and Zimbelman (2009) show that strategic reasoning and brainstorming help managers modify audit programs in high fraud risk scenarios. However, results show neither the strategic reasoning nor brainstorming group implement all of the audit procedures recommended by the expert panel. The authors offer three possible explanations. First, auditors may be anchoring on prior year testing. Second, as managers, they may not have the right level of experience. Finally, it may be because they lack the skill set required because they are not forensic specialists.

There are three things of note in these three examples (Knapp and Knapp 2001; Hammersley et al. 2011; Hoffman and Zimbelman 2009). First, each of these is an example of the effect of general audit experience in a fraud-related task specific situation. Second, when evaluating the performance of auditors with regard to fraud planning activities, researchers generally discuss how the sample is of a particular class (e.g., seniors versus managers). Individuals can have varying levels of direct task-specific experience and be of a different job level class, particularly when it comes to an infrequent event, like intentional material misstatements. Third, in each of the above studies, there is some mention of a class of individuals that did not perform as well as expected or as well as another group. This is attributed to either lack of knowledge (Knapp and Knapp 2001; Hammersley et al. 2011) or experience (Hoffman and Zimbelman 2009). As experience is an opportunity to gain knowledge (Davis and Solomon 1989), and many auditors do not have the opportunity to directly work on an engagement where a material financial statement fraud is detected (e.g., Hammersley et al. 2011; Hoffman and Zimbelman 2009), relying on less experienced individuals to be the main preparers of the audit program could be a concern. This is particularly true since the judgments of reviewers tend to be biased toward what already exists in the work papers (Ricchiute 1999), even though Agoglia et al. (2009) find that task-specific experience in reviewing work papers can help reduce some of this “flow-through” bias.

There is little focus on the direct fraud-related task-specific experience (i.e., number of engagements one has been on where fraud has been detected) in the literature. It is rarely the main focus and may be included only as a potential covariate (e.g., Pincus 1989; Hammersley et al. 2011). For example, in Hammersley et al. (2011), the authors note that the participants have been on an average of 0.24 engagements where a material fraud was detected. In the fraud

detection program quality analysis (Table 3), this variable is significant and is included as a covariate but is not discussed further (Hammersley et al. 2011, 95). In other studies, experience with fraud or material fraud on engagements is mentioned, but it is usually a descriptive statistic to show that auditors do not have many opportunities to gain direct fraud-related task-specific experience (e.g., Hammersley et al. 2011; Loebbecke et al. 1989). Or, it is used to demonstrate that there is no difference between the treatment groups (e.g., Hoffman and Zimbelman 2009; Pincus 1989).

Other studies go more in depth and attempt to examine the impact on fraud detection. Rose (2007, 218) hypothesizes that auditors who “have been directly involved with the detection of financial statement fraud” will have knowledge structures better suited to detecting fraud in the future. Rose (2007) expected but did not find that these individuals pay more attention to evidence that suggests aggressive financial reporting. However, these auditors are more likely to rate the likelihood of intentional misstatement higher. Unfortunately, this study was not designed to determine why experience impacts the misstatement assessment but not the level of attention. One possible reason is that auditors with prior fraud engagement experience are more prone to assume that unexplained differences are fraud-related. This could indicate that having auditors with fraud experience on non-fraud engagements could lead to assessing fraud risk higher, excluding error-related hypotheses, and developing inefficient audits that use more procedures and hours than warranted.

One study focuses on the effect of one’s level of direct fraud-related task-specific experience on an individual’s ability to modify an audit program and revise a prior year audit budget in the presence of fraud (Boritz et al. 2015). This study explores whether fraud specialists have the right expertise to be able to modify audit plans in response to a “higher than

low” level of fraud risk. Boritz et al. (2015) find that forensic specialists propose a wider range of additional procedures than auditors, which are marginally more effective but not more efficient when the number of procedures (i.e., cost) is taken into consideration. No differences was found for selection of standard procedures. In addition, both groups (auditor and forensic specialist) increase the overall budgeted hours by a similar amount but allocate hours differently. Further, results indicate that fraud specialists expect more procedures to be performed within those hours than auditors do, which indicates that fraud specialists may not be as realistic or budget-conscious as auditors are.

2.3.1.1.4 Experience Hypothesis Development

In summary, previous literature indicates that general audit experience does not always lead to optimal FJDM (Knapp and Knapp 2001; Asare and Wright 2004; Hammersley et al. 2011; Hoffman and Zimbelman 2009). Individuals with domain-specific experience gain skills, which improve as they progress through the ranks (Wright 2001). These skills allow them to identify patterns and develop problem representations, which are useful in assessing risk and designing audit steps to identify the cause of the misstatement (Hammersley 2006). Exposure to engagements where fraud is detected leads auditors to make more accurate fraud detection judgments but not necessarily to pay more attention to evidence (Rose 2007). Finally, fraud specialists make a wider range of marginally more effective audit plan modifications than auditors but may be using too many procedures in the budgeted time (Boritz et al. 2015).

As such, it is expected that individuals who have detected fraud and/or designed audit programs to detect specific fraud schemes will be more likely to recognize a fraud scheme, assess fraud risk appropriately high, and be better able to develop procedures to detect the fraud,

as compared to those without such experiences or exposure. Similar types of individuals who are placed in the lower risk scenario will be able to recognize that risks are lower and will assess risk as lower but may or may not modify the audit plan in such a manner that does not include unwarranted test work.

H1a: Individuals with more fraud-related task-specific experience will have more effective fraud risk assessments than those with less fraud-related task-specific experience.

H1b: Individuals with more fraud-related task-specific experience will have more effective audit plan modifications than those with less fraud-related task-specific experience.

2.3.1.2 Certifications

Certifications are one indication that an individual has some baseline level of proficiency with regard to a particular domain.¹⁷ For example, the CPA license represents recognition of some minimal level of audit proficiency, as the exam to obtain licensure covers audit knowledge. Consequently, only CPAs are allowed to certify a company's financial statements. Similarly, it is expected that individuals gaining well-regarded fraud-related certifications, such as the Certified Forensic Examiner (CFE) and Certified in Financial Forensics (CFF), will demonstrate higher fraud proficiency.

For a certification to be meaningful, it must come from a reputable organization. The AICPA is the largest accounting association in the world with nearly 400,000 members in almost 130 countries and has been serving the community for nearly 125 years (AICPA website 7/25/2013a). The AICPA is responsible for creating and writing the Uniform CPA Exam and also offers a credential called the CFF (AICPA website 7/23/2013b). While the CFF credential

¹⁷ However, as researchers, once we progress beyond the actual certification (i.e., yes or no) the certification construct becomes highly correlated with experience.

has only been offered since 2008, given the reputation behind the AICPA, the CFF will likely become a more common fraud-related certification in the future, particularly since it is tied to the CPA. Another forensic certification tied to an accounting certification (i.e., Chartered Accountant (CA)) is the Investigative Forensic Accountant (IFA) in Canada (Boritz et al. 2015), which carries a similar, reputable standing. Worldwide, the Association of Certified Fraud Examiners' (ACFE) with their CFE credential is probably the most well-known certification with more than 60,000 members in at least 150 countries (ACFE 2012). Some less reputable certifications include those run by organizations that have no code of ethics or by individuals without degrees or certifications in forensic accounting or fraud examination. These include the Forensic CPA Society, Inc. and the American College of Forensic Examiners International, which issue the FCPA and Cr.FA, respectively (Huber 2013).

Requirements to obtain these certifications should be rigorous. In other words, only those individuals who are knowledgeable and well-qualified within the specific domain (auditing, fraud examination or forensic accounting) should be able to obtain one. Within the U.S., obtaining a CPA license is governed by the board of accountancy within each individual state or jurisdiction, which has its own education and experience requirements; however, everyone must pass the Uniform CPA Examination (AICPA website 7/25/2013c) . The Uniform CPA Examination consists of four areas (auditing and attestation, business environment and concepts, financial accounting and reporting, and regulation). Within the audit and attestation section, a subsection of the exam covers consideration of fraud, internal controls, and other risk assessment procedures (AICPA 2011). While parts of the exam cover the performance of various procedures, none of the 2013 exam content specifications seem to focus on modifying audit plans in response to fraud risk. The Canadian Institute of Chartered Accountants (CICA)

Uniform Evaluation (UFE) is a three day exam, which covers the following competencies: governance strategy and risk management, performance measurement and reporting, assurance, finance, taxation, and management decision making. Similar to the U.S. exam, CAs are responsible for being able to identify specific business and fraud risk factors that could result in material misstatements but, again, include little on audit plan modification (CICA 2012). Further, there is no clear indication in the specifications of either exam indicating the testing of various fraud schemes.

For the CFE credential, the ACFE requires that candidates meet minimum academic and professional standards according to a point system. Generally speaking, this means they will have at least a bachelor's degree, two years of professional experience in a field directly or indirectly related to the detection or deterrence of fraud, and will take an exam covering financial transactions and fraud schemes, law, investigation, and fraud prevention and deterrence (ACFE website 7/23/2013). For the CFF credential, individuals must be a licensed CPA, pass the CFF exam covering an assortment of fundamental and specialized forensic knowledge, and have at least 1,000 hours of professional experience in forensic accounting and 75 hours of forensic accounting-related CPE in the last five (5) years (AICPA 7/23/2013 website). The CA-IFA must apprentice, take the CA exam, work as a CA for an additional 3 years including at least 1,500 hours in a forensic division or specialty firm, obtain a graduate diploma in investigative and forensic accounting, and apply for the designation (Boritz et al. 2015).

Therefore, a fraud-related certification should be recognized by individuals in practice, come from a reputable organization, and have certification standards that demonstrate an individual has a base level of fraud detection proficiency. If so, generally speaking, this individual should be able to make more effective fraud judgments and decisions than someone

without a fraud-related certification. However, auditors with CPA or CA licenses are responsible for knowledge regarding fraud risk assessments. This indicates that they may be capable of performing as well as individuals with fraud-related certifications on the fraud risk assessment judgments. Therefore, any individual with a certification from a reputable organization could be expected to assess fraud risk more effectively than someone who does not have a certification. However, since CPAs and CAs are not tested on their knowledge with regard to fraud schemes and audit plan modifications, one cannot speculate as to their having the same level of proficiency in the fraud domain as an individual who has obtained a fraud-related certification. As such, the following hypotheses have been formed with regard to certifications.

H2a: There will be no difference in the effectiveness of the fraud risk assessments between those who have fraud-related certifications and those who have CPA or CA licenses.

H2b: Individuals with a fraud-related certification will modify audit plans more effectively than those who do not have a fraud-related certification.

2.3.1.3 Formal Fraud Education, Formal Fraud Training, and Informal Fraud Training

Failure to perform as hypothesized in a FJDM task many times leads to speculation that the participants lack the knowledge or training required to complete the tasks required of them (e.g., Hackenbrack 1993; Hammersley et al. 2011; Asare and Wright 2004; Corless 2009; Hassink et al. 2010; Knapp and Knapp 2001). Hammersley (2011) notes most auditors will increase their fraud knowledge through training and identifies a lack of research regarding how individuals with forensic accounting coursework and training impacts FJDM. This study contributes to the accounting and fraud literature by examining the impact of these variables on the fraud planning processes.

2.3.1.3.1 Formal Fraud Education

The offerings available from universities are diverse both in quantity of classes and types of degrees (Fleming et al. 2008). Utica College was the first to offer standalone undergraduate (1987) and graduate (1999) programs in the area of economic crime (Curtis 2008b). Florida Atlantic University was the first of its kind to offer a master's degree in accounting with a concentration in forensic accounting (Young 2008). However, many other colleges and universities also offer one to two courses at the undergraduate and/or graduate level in either forensic accounting or fraud examination (e.g., Curtis 2008a; Fleming et al. 2008). Historically, single forensic accounting and/or fraud examination courses were not very common (Seda and Peterson Kramer 2014). However, they are gaining a lot of traction, growing from four (4) universities offering a single course (Rezaee et al. 1996) and one (1) standalone undergraduate degree (Curtis 2008b) to 447 U.S. and international universities offering single courses, 81 offering degree programs, and 106 offering concentrations and minors (Seda and Peterson Kramer 2014). To help educators become better equipped to deliver these types of classes, the ACFE provides educator resources and information, including sample syllabi, videos, case studies, and assistance finding guest lecturers who are willing to donate their time (ACFE website 7/27/2013).

West Virginia University spearheaded a National Institute of Justice (NIJ) project involving 12 project members and 46 subject matter experts to develop a model curriculum for fraud and forensic accounting (Fleming et al. 2008; Kranacher et al. 2008). The November 2008 special issue of *Issues in Accounting Education* lays out a number of the topics and skills those academics in the field consider important enough to include in the fraud and forensic accountant curricula and NIJ report. Recurring themes within these and other articles on recommended or

current curricula include critical thinking, fraud prevention and detection, financial statement fraud, red flags, risk assessments, fraud schemes, audit responses to fraud risks, hands-on experience, the digital environment, ethics, and other behavioral sciences such as criminology, sociology, psychology, and anthropology (Fleming et al. 2008; Kranacher et al. 2008; Pearson and Singleton 2008; Kresse 2008; Curtis 2008a, 2008b; Ramamoorti 2008; Smith and Crumbley 2009; Rezaee et al. 1996). See Table 2.1. The learning objectives taught in these courses give individuals the opportunity to learn and gain knowledge relevant to fraud risk assessments, audit plan modifications, and fraud judgment and decision-making.

[Insert Table 2.1 here.]

While the empirical studies examining the effectiveness of forensic graduate certificate and master's programs are limited, generally speaking, instruction leads to knowledge, which leads to improved judgment and decision making (Bonner 2008). This is evidenced in accounting studies involving judgments on earnings estimates (Gobeil and Phillips 2001), financial variability (Phillips and Vaidyanathan 2004), and cash to accrual income conversions (Herz and Schultz 1999). In addition, there are other studies that examine the success of formal fraud education courses in the area of fraud detection (Choo and Tan 2000) and fraud risk assessments (Carpenter et al. 2011). Both studies find that courses focusing on fraud increase student performance with regard to their respective judgments. Students who learn about fraud cues and professional skepticism in an intense (i.e., over the entire college course) versus a basic (i.e., one class session only) environment are better at detecting fraud (Choo and Tan 2000). Similarly, students who learn through a forensic accounting college course assess fraud risk more similarly to an expert panel than do standard audit students (Carpenter et al. 2011). Further, retesting shows the finding persists for at least seven months after the class has ended. Based on this prior

research, it is expected that individuals who have taken a university forensic accounting or fraud examination course or otherwise gained a fraud-related degree (e.g., master's, major, minor, certificate in the fraud domain) will be able to make fraud risk assessments that are more effective than those who have not had a formal fraud education course.

H3a: Individuals with formal fraud education will have more effective fraud risk assessments than individuals who have not had any formal fraud education.

The literature for audit plan modifications and formal fraud education is scant. It is possible that a single course or even a master's program may not provide the knowledge and experience needed to make effective fraud judgments and decisions. However, the content that is covered in these types of courses and graduate programs is different than that discussed in typical auditing courses. Fraud or forensic accounting courses spend more time covering specific fraud schemes and fraud detection techniques than standard audit courses (Young 2008). This should allow individuals to identify the specific fraud schemes and subsequently modify audit plans to target risks more effectively than those individuals who have not had such a class or graduate program.

H3b: Individuals with formal fraud education will have more effective audit plan modifications than individuals who have not had any formal fraud education.

2.3.1.3.2 Formal Fraud Training

Auditing standard No. 1, "*Training and Proficiency of the Independent Auditor*," requires the audit "be performed by a person or persons having adequate technical training and proficiency as an auditor" (PCAOB 2014c, AU 210.01). After gaining a degree and professional certifications, this ongoing training is frequently called continuing professional education (CPE) and can be offered by a number of sources including employer training, external third parties,

conferences, and webinars. Formal fraud training also tends to be shorter in length (lasting anywhere from an hour to 2-3 weeks) than formal fraud education and not offered for college credit.¹⁸ When distinguishing between auditor training and fraud-related training, the only difference is the overall topic focus.

Empirically, the author is unaware of any studies that look at the impact of formal fraud training (i.e., CPE), such as conferences, firm training, and shorter length webinars, as it relates to fraud planning activities. However, generally speaking, a public accounting firm's financial performance (i.e., proxy for audit quality) is positively associated with CPE in certain situations in Taiwan (Chen et al. 2008). Training is associated with audit quality, because auditors learn valuable information at these trainings that keeps their skills and knowledge up-to-date with current standards, trends, and services that their clients value. As one example, in an afternoon exercise (similar in length to a CPE session), students acting as "honorary agents" of the Internal Revenue Service Criminal Investigation (IRS CI) unit gain hands-on experience simulating an investigation from tip to department briefing (Brickner et al. 2010). Participants self-report learning skills that would be valuable to the career at hand, IRS CI agent, including: fraud detection, investigation, evidence gathering, and communication skills.

There are a number of fraud domain topics in which auditors or forensic accountants could gain training that would give them the opportunity to increase their proficiency as it relates to fraud detection. However, not all fraud topics are relevant (e.g., interviewing skills, expert witnessing) to this study (Cohen et al. 1996; Pope and Ong 2007). As such, while all formal fraud training would be expected to increase fraud detection proficiency, certain types of formal

¹⁸ In this study, CPE will be evaluated based on training received in the most recent year.

fraud training are expected to be more relevant to audit planning activities (e.g., fraud risk assessments, audit planning, and fraud schemes). Therefore, individuals who continue to be trained in these types of topics throughout their career are expected to be more effective in their FJDM than individuals who do not.

H4a: Individuals with formal fraud training will have more effective fraud risk assessments than individuals who have fewer hours in formal fraud training.

H4b: Individuals with formal fraud training will have more effective audit plan modifications than individuals who have fewer hours in formal fraud training.

2.3.1.3.3 Informal Fraud Training

Whereas the previous sub-section focused on formal fraud training programs, such as firm training or CPE, this sub-section focuses on other informal ways of learning about the fraud domain. Individuals have the opportunity to gain knowledge about topics from a number of informal methods including reading professional articles, magazines, (e.g., Fraud Magazine), and/or books on the topic of fraud.

Rose et al. (2012) examines the impact of a checklist of risks on the quality of novices' fraud risk assessments, as compared with those completed by experts. Specifically, the checklist is organized by the knowledge structure of those experts rather than one organized by the fraud triangle categories, as is in line with AU Section 316 "*Consideration of Fraud in a Financial Statement Audit*" formerly known as SAS No. 99 (PCAOB 2014b). To do this, the research team created an expert panel decision aid using a panel of five (5) experts and a technique called Pathfinder Network Scaling to measure the interrelationships of the experts' answers and determine the combined "knowledge structure" (Rose et al. 2012). This analysis is what allows for the creation of the expert decision aid as well as the comparisons between the novices and the experts. After using this decision aid, students' knowledge structures are more like the expert

panel's knowledge structures, and their risk assessment judgments are also closer to the panel's judgments. This demonstrates that it is possible to give auditors, novices in particular, the tools needed to allow them to make better decisions if the tools are designed in a manner that facilitates the knowledge structure needed.

While the evidence in Rose et al. (2012) does not directly link reading articles, magazines, or books on fraud with the ability to perform audit planning activities related to fraud risk, there are some correlations. Professional journals, magazine articles, books, and other media on fraud are written by people who are knowledgeable on the topic. These individuals are academics, seasoned professionals, journalists, or, on some occasions, whistleblowers and fraudsters, themselves. Their writing is an insight into their knowledge structures and thought processes. Each of these forums represents an opportunity for fraud-related informal training to take place, particularly if it relates to risks or fraud schemes. The effect may not be as strong as in the formal fraud education or training where individuals have more opportunities to engage with professors, participate in activities, or receive feedback. However, informal fraud training will provide incremental benefits above those without the training. Therefore, it is expected that individuals with informal fraud training will have more effective FJDM than those without.

H5a: Individuals with more informal fraud training will have more effective fraud risk assessments than individuals who have less informal fraud training.

H5b: Individuals with more informal fraud training will have more effective audit plan modifications than individuals who have less informal fraud training.

2.3.2 Professional Skepticism

Hammersley (2011) discusses three epistemic motivation measures applicable to fraud planning: the need for cognition, the need for cognitive closure, and professional skepticism (both state and trait). Epistemic motivation is a construct that refers to the amount to which

people strive to understand situations fully (Kruglanski 1989) and can have both situational and person-trait aspects. For auditors, this involves the need to fully comprehend an audit client, its industry, risks, and information systems (Hammersley 2011) and is important, as it impacts an individual's hypothesis generation process (Kruglanski 1990).

Kruglanski (1989, 13) explains that to generate hypotheses, one must have knowledge "pieces" in our "LEGO" store, and they must be available in "our searchlight of awareness." In other words, our knowledge is like LEGO pieces and can be pieced together and taken apart. It can change over time as we gain new information and perspective. However, only certain parts of our knowledge are available to us at any given time (i.e., searchlight of awareness). What we know is based in part on our *cognitive capability* (Kruglanski 1989). If you are an expert, you will likely have a wealth of information and knowledge about a particular domain and be able to generate many hypotheses about the issue at hand, whereas someone with less knowledge will generate fewer hypotheses. Further, someone who has been recently primed regarding a specific subset/area within a domain will likely focus their hypotheses more on those issues rather than other possibilities.

One of the three epistemic motivations discussed by Hammersley (2011) is the need for cognition. A person's need for cognition can be thought of as the need to make sense of the situation around her in "meaningful, integrated ways" (Cohen et al. 1955, 291). What exactly is meaningful and integrated depends on each person and situation, as well as how important it is to have that cognitive need satisfied. Petty et al. (2009) note that individuals with a higher need for cognition have tendency to differentiate between "relevant" information, such as strong and weak arguments, in addition to whether or not that information will be useful in predicting the outcome at hand. Furthermore, these individuals "are more likely to evaluate their thoughts for

validity, a process called *self-validation*” (Petty et al. 2009, 321).

Another way to measure the motivation to generate hypotheses can be explained as the need for cognitive closure. The need for cognitive closure can be thought of as a continuum with the need for cognitive closure (e.g., need to find an answer or stopping point) at one end versus a need to avoid closure (e.g., keeping an open mind) at the other (Kruglanski 1989). There are two types of cognitive closure continuums, nonspecific and specific. General assumptions that hold for each are that the situation: is bound to a single topic, comes from any number of possible motives, can arise from various situations, and is biased/directional (unbiased/non-directional) based on whether it is specific (nonspecific) in nature. For example, with nonspecific cognitive closure, individuals “desire [a] definite answer in some topic, *any* answer as opposed to confusion and ambiguity” (Kruglanski 1989, 14). However, there are certain situations, such as auditing, where some level of reservation in judgment is desirable and mistakes are to be avoided, because the wrong judgment is too costly. In this situation, the opposite side of the continuum, need to avoid nonspecific closure, is more desirable. Individuals who need to avoid closure will seek additional information that is unbiased (either positive or negative in valence depending on the situation). Need for specific cognitive closure is similar but instead of seeking *any* answer or knowledge, the individual is seeking *particular* answers that are directionally biased toward the positive and will tend to avoid the negative for that particular topic. Further, Kruglanski and Fishman (2009) note that individuals with a lower need for cognitive closure generate more hypotheses and alternatives than those who have a higher need for cognitive closure but are generally less confident.

The epistemic motivation measure used in this study is professional skepticism, which is specifically accounting- and auditing-related. There are two ways of thinking about professional

skepticism. The “neutral,” which includes having a “questioning mind” when gathering evidence but “neither assumes that management is dishonest nor assumes unquestioned honesty” (PCAOB 2014d, AU 230.207-209). The other is the “presumptive doubt,” where auditors should have some level of doubt and lean more toward the side of disbelief until evidence indicates otherwise (AICPA 1988, SAS No. 57; AICPA 2002, SAS No. 99; PCAOB 2014a, AU 342.304). In this study, professional skepticism is seen as “a multi-dimensional individual characteristic ... [that] can be both a trait (a relatively stable, enduring aspect of an individual) and also a state (a temporary condition aroused by situational variables)” (Hurt 2010, 150).

The trait portion of professional skepticism is commonly measured with the Hurt Professional Skepticism Scale and is made up of six (6) components: a questioning mind, suspension of judgment, search for knowledge, interpersonal understanding, self-esteem, and autonomy (Hurt 2010). Cacioppo and Petty (1982, 116) created an instrument to capture an individual’s need for cognition or “tendency to engage in and enjoy thinking” by combining aspects of Cohen et al.’s (1955) Hierarchy of Needs Measure (i.e., achievement, affiliation, autonomy, recognition, and cognition) and Mehrabian and Bank’s (1978) Questionnaire Measure of Individual Differences in Achieving Tendency. While Cacioppo and Petty’s (1982) instrument measures enjoyment of thinking more generally and thoroughly, it does overlap to some extent with the more accounting-related construct, professional skepticism, particularly with the subconstructs “search for knowledge” and “suspension of judgment.” Both of these subconstructs will be discussed further in the trait professional skepticism section. Furthermore, characteristics measured within the need for cognitive closure also share qualities measured within trait professional skepticism, including suspension of judgment, self-determination about the facts at hand, and self-esteem. Outwardly, each of these characteristics is expected of

forensic professionals as experts in their domain. This coupled with the overlap with professional skepticism led to the design choice to focus on the accounting-related construct of professional skepticism in this study. However, because the need for cognition and the need for cognitive closure include characteristics not covered exactly within professional skepticism, this could lead to some additional insights, which could be considered in future research. As such, the remainder of this sub-section discusses findings and applicable literature relating to the person (trait) aspects of professional skepticism as they relate to the fraud planning literature.¹⁹

Early professional skepticism literature typically uses single constructs developed from other disciplines or tries to manipulate situational level in experiments in an attempt to proxy for professional skepticism (e.g., Shaub 1996; Shaub and Lawrence 1996; Choo and Tan 2000; McMillan and White 1993). Recent literature attempts to capture trait professional skepticism and takes a more neutral perspective by defining professional skepticism “as a multi-dimensional construct that characterizes the propensity of an individual to defer concluding until the evidence provides sufficient support for one alternative/explanation over others” (Hurtt 2010, 151).

Professional skepticism is required and important in the performance of an audit, as seen by its inclusion in the first statement of auditing standards, SAS No. 1 (AICPA 1997). However, there is some question as to what level of professional skepticism is ideal when performing an audit. Generally speaking, individuals who have higher levels of trait professional skepticism as measured by Hurtt Professional Skepticism Scale (HPSS) (Hurtt 2010) make judgments that are more skeptical in nature (Hurtt et al. 2012; Popova 2013). In an ambiguous misstatement scenario, students with higher skepticism rate fraud cues as more relevant to their decision

¹⁹ For more detailed literature reviews on professional skepticism see Nelson (2009) and Hurtt et al. (2013).

(Popova 2013). In a work paper review study, Hurtt et al. (2012) finds that auditors with higher levels of trait skepticism are more likely to find contradictory information in work papers, whereas less skeptical auditors tend to find more factual errors. This implies that those with higher levels of professional skepticism may be able to see the bigger picture and detect the fraud scheme being used rather than just disparate incorrect facts.

It has also been suggested that it is possible for an auditor's professional skepticism to be too high in a given situation, leading to inefficiency and potential over-auditing (Hurtt et al. 2012; Nelson 2009). This may be applicable in the no fraud scenario if individuals with high levels of professional skepticism seem to "see" fraud everywhere. However, neither Hurtt et al. (2013) nor Nelson (2009) indicate what level of professional skepticism would be "too high" nor which types of individuals would most likely fall into this category. But theoretically, individuals who have high levels of many of the HPSS subconstructs (i.e., questioning mind, autonomy, suspension of judgment, and self-esteem) (Hurtt 2010) should be capable of sufficiently assessing fraud risk.

H6a: Individuals with higher levels of trait professional skepticism will have more effective fraud risk assessment judgments than individuals with lower levels.

This inherent professional skepticism trait should also be enough to raise suspicion and cause an individual to consider that more work should be done in the event that fraud risk is high. Therefore, individuals with high professional skepticism will be more likely to increase the extent of audit tests as seen in some prior studies (e.g., Zimbelman 1997; Hammersley et al. 2011; Favere-Marchesi 2013). However, there is nothing inherent within trait professional skepticism that would indicate that individuals with professional skepticism should modify audit plans more effectively than those with lower levels of professional skepticism. Therefore, no

difference is expected among individuals' audit plan modifications due to trait professional skepticism.

H6b: There will be no difference in audit plan modification effectiveness between individuals with higher and lower levels of trait professional skepticism.

2.3.3 Relationship between Fraud Detection Proficiency and Professional Skepticism

Nelson's (2009) and Hurtt's (2013) models of professional skepticism are built on incorporating interactions from any of the fraud detection proficiency constructs, as both theorize that not only are auditors' behaviors a function of their traits, but also of the situation they are in. As such, they believe professional skepticism should interact with the evidence provided, educational background, training, certifications, and experiences. However, given the lack of relevant literature, it is not possible to hypothesize all of the possible interactions. Therefore, these interactions will be considered as an exploratory research question.

It has also been suggested that it is possible for an auditor's professional skepticism to be too high in a given situation, leading to inefficiency and potential over-auditing (Hurtt et al. 2012; Nelson 2009). What level of professional skepticism is too high and which types of individuals tend to over-audit or be inefficient remains an open research question (Hurtt et al. 2013; Nelson 2009). This study allows for the ability to evaluate two fraud risk scenarios, individuals from a variety of firms, job ranks, service lines, and experiences. It provides a unique opportunity to assess the effect of trait professional skepticism on individuals, their audit planning judgments, and their potential to over-audit.

2.3.4 Relationship between Fraud Detection Proficiency and Over-auditing

Over-auditing, or expending more effort on an audit than the risks warrant (Causholli and Knechel 2012), has been an industry concern for years (e.g., O'Keefe et al. 1994; Ettredge et al.

2008; Hackenbrack and Knechel 1997). More recently, the public's and regulators' perception of over-auditing has hurt the profession. The "[d]istrust, of auditors motives, incentives, and judgments" comes from what Palmrose (2009, 286) calls the "404 backlash." Many have complained of the exorbitant fees caused by the implementation of Auditing Standard No. 2 (AS2), *An Audit of Internal Control Over Financial Reporting Performed in Conjunction with an Audit of Financial Statements* (PCAOB 2004; PCAOB 2006). As a result, a new standard was issued with the intention to decrease costs and increase efficiency. In essence, AS2 became thought of as an unintended, regulator-created over-auditing standard, and Auditing Standard No. 5 (AS5), *An Audit of Internal Control over Financial Reporting That is Integrated with an Audit of Financial Statements* (PCAOB 2007b), was meant to bring fees and procedures back in check. Krishnan et al. (2011) use a stable AS2 and AS5 sample (i.e., no auditor change) to test whether over-auditing was taking place under AS2 and to what extent. The authors confirm over-auditing to the tune of approximately 4% per firm per year. Furthermore, firms with internal control weaknesses paid premiums under AS2 (AS5) of 42% (15%) if they had no prior internal control weaknesses but paid 59% during AS2 and 48% during AS5 if they had weaknesses during both periods. This is consistent with the idea that over-auditing decreased when AS5 was implemented.

However, according to a theoretical "welfare game," failed audits and over-auditing are to be expected when all clients are unethical (Coate et al. 2002). The authors' model finds that if the auditor is ethical, the client will be, as well. However, you cannot avoid over-auditing and failed audits completely, since there is still a probability of some unethical clients and a possibility of random errors due to incompetent clients. This finding is confirmed by Deshmukh et al. (1998) who develop an analytical model using signal detection theory for the detection of

management fraud. In signal detection theory, evidence is analyzed as either a signal, which is accepted or as noise, which is rejected. Deshmukh et al. (1998) put this theory to work in an auditing context. The authors surmise that auditors gather and evaluate evidence about a series of accounts, decide whether or not each of those accounts is fairly stated, and ultimately issue an audit opinion. For each of those accounts, the possible options are: (1) correctly identify as management fraud (hit); (2) correctly accept as fairly stated; (3) incorrectly identify as management fraud (Type I error or false alarm); or (4) incorrectly accept as fairly stated (Type II error or potential litigation, reputation cost) (Deshmukh et al. 1998). Under this situation, the only way to reduce the potential costs of Type II errors from issuing an unqualified audit opinion is by increasing the number of Type I errors or potential false alarms. In other words, to reduce reputation and litigation costs due to undiscovered fraud, auditors need to over-audit.

The judgment and decision-making literature has mixed inferences about over-auditing. Hoffman and Zimbelman (2009) show that auditor judgments in the strategic reasoning and brainstorming groups are more comparative to the expert panel, but they still fall short (i.e., under-audit). Hammersley et al. (2011) demonstrate that senior associates are more likely to expand hours but not necessarily in the right areas, basically under- and over-auditing at the same time. Monroe and Ng (2000) find that recency order effects, experience, and the interaction of these two independent variables do not impact risk assessments. The authors theorize the recency effects are mitigated by the importance of the task, in this case the inherent risk assessment. As a result, it is possible that auditors could be focusing more attention on the high risk items than low risk items regardless of the order, which could result in putting more audit hours than necessary towards an account that has an overall lower inherent risk (Monroe and Ng 2000). When evaluating industry specialization and inherent risk, Taylor (2000) finds that those

without specialization are less confident about their risk assessments and more likely to assess inherent risk higher than necessary, possibly leading to an over-auditing situation.

Even auditors with prior exposure to fraud are not immune. Rose (2007) finds that people who have prior fraud experience are more likely to assess fraud risk higher but do not pay more attention to the evidence. Although his study was not designed to determine why, the reason could be one of two things, either 1) auditors are efficient and recognize the cues and assess risk appropriately quickly without as much time as others, or 2) these auditors may be prone to over-auditing and “seeing” fraud everywhere. This could lead to individuals assessing fraud risk higher and developing inefficient audits on engagements, particularly low risk engagements.

In a study on dispositional distrust, Dibben and Rose (2010) find that auditors with high levels of distrust are not likely to distinguish between scenarios with more or fewer embedded fraud cues. The authors interpret this to mean that individuals who inherently distrust their clients will predominantly assume fraud problems from the start, leading to potentially higher levels of risk assessments and less efficient audits being performed. Dibben and Rose’s (2010) evidence shows that in low risk scenarios, this in fact may be true. Risk assessments were rated higher, but not significantly, than the low distrust individuals. Therefore, in low risk situations they could be prone to over-auditing. However, in the high risk situation the low distrust individuals actually rated fraud risk higher (Dibben and Rose 2010). Further, the authors find no difference for the high distrust individuals between the low and high risk situations. Taken all together, this may indicate that high distrust individuals (auditors) may not properly recognize the need to modify procedures from the standard audit program and therefore over-audit, over-audit in the wrong areas, or do not over-audit at all.

This uncertainty is further confirmed in a study by Boritz et al. (2015). Forensic professionals are more effective at identifying a wider range of additional procedures in a higher fraud risk scenario (Boritz et al. 2015). However, with higher billing rates than auditors, forensic professionals have not been evaluated in situations of lower fraud risk to see if the results hold. This, combined with the difficulty in evaluating whether the greater number of tests assigned by the forensic professionals can be performed in the same amount of time assigned by auditors for a smaller amount of different procedures (Boritz et al. 2015), makes evaluating over-auditing in this study problematic.

There is clear evidence that over-auditing is a concern and a potential issue in many situations. This leaves questions regarding over-auditing, specifically as it relates to fraud detection proficiency, unanswered. Forensic professionals (Boritz et al. 2015) and auditors with fraud exposure (Rose 2007) may over-audit in certain situations. However, with the exception of experience, none of the other papers reviewed have tested the relationship between fraud detection proficiency performance and over-auditing. Given the importance to the public, profession, and regulators, it is crucial to provide evidence on this topic. Including both high and low fraud risk scenarios, as well as auditors and forensic professionals in this study allows for post hoc exploratory analysis regarding this relationship.

CHAPTER THREE: RESEARCH METHODS

This chapter details the research methods used to test the hypotheses in this study.

Section 3.1 describes the research design, including the participants, detailed scenario information, the dependent, independent, and control variables, as well as information regarding the benchmark panel and administration of the experiment. Section 3.2 details hypothesis and post hoc testing and lays out the multiple regression models. Finally, section 3.3 explains the results of pre-tests and a pilot study, as well as the instrument modifications that resulted from those tests and from participating accounting firms' risk management reviews.

3.1 Research Design

A survey-based scenario with one experimental manipulation (fraud versus no fraud) explores the fraud judgment and decision making (FJDM) of auditors and forensic professionals exhibiting varying levels of fraud detection proficiency. The instrument in this study is a modified version of the Asare and Wright (2004) and Hammersley et al. (2011) instruments and includes a no fraud version of the case based on the restated financial statements.²⁰ The scenario is based on an actual company in the medical products industry that uses the revenue cycle to commit financial statement fraud through channel stuffing and bill-and-hold schemes involving only a small portion of their clients.

3.1.1 Participants

The study includes 41 auditors and 10 forensic professionals. These individuals range from senior associates to partners and come from a mix of firms (small, mid-tier, and Big4). The sample size was derived using a power analysis containing eight (8) predictors, an estimated

²⁰ Both Hammersley et al. (2011) and Asare and Wright (2004) provided the original versions of their instruments and provided permission to use and modify as needed.

medium effect size of 0.15, power of 0.80, and alpha of 0.05 (Soper 2013; Cohen 1988; Cohen et al. 2003; Abramowitz and Stegun 1965).

Variances among the participants in all proficiency variables (fraud-related task-specific experience, fraud-related training, education, certifications, informal training, and professional skepticism) are critical to being able to properly test the conceptual model. For example, few auditors are expected to have fraud-related certifications or to have had college courses solely geared towards fraud or forensic topics. Associates and new senior associates were not expected to make good participants for this study because they are less likely to have had the opportunity to detect fraud on their engagements, to have worked on a restatement (i.e., gain meaningful fraud task-specific experience), or to have earned fraud-related certifications. Although to the extent that college courses, additional fraud-related training, informal training, and professional skepticism are dominant variables, it is theoretically possible these participants could have more fraud detection proficiency than others with more of these traits. Further, while associates are included in fraud brainstorming sessions and are encouraged to contribute ideas regarding possible risks and schemes, they are not typically in charge of assessing overall fraud risk of an engagement, nor are they involved in creating the initial audit plan or budget allocations (Abdolmohammadi 1999). Lower level senior associates may get opportunities to assess fraud risk, develop the initial audit plan, and budget allocation on smaller engagements when there are minimal expectations for changes from the prior year, but these tasks are largely left to more senior individuals with more experience.

The sample also includes forensic specialists (i.e., forensic consultants) to see how their FJDM compares to those of auditors in both high and low fraud risk scenarios. Forensic professionals are expected to differ from auditors in a number of proficiency variables, especially

in direct fraud-related task-specific experience, formal fraud training, and fraud-related trainings. Given the expected differences between these two groups, this study attempts to tease out those differences in a number of ways. First, by measuring the impact of each of the fraud detection proficiency variables. Second, by including additional control variables more common to auditors, such as general audit experience and industry specialization to evaluate differences in characteristics. Third, by parsing the sample in different ways, such as analyzing the individuals in the fraud scenario separate from the no fraud scenario to see if forensic individuals behave differently in different situations. Finally, by modifying the dependent variable to measure not just whether the participant chooses the same procedure modifications as the benchmark panel but to measure whether the participant's modification represents over-auditing or under-auditing behavior.

Boritz et al. (2015) find that forensic specialists create a wider range of marginally more efficient procedures than do auditors, and that both groups increase budgeted hours similarly but allocate hours differently. Collectively, this could indicate that forensic professionals, while selecting effective procedures, may be selecting more procedures than can be reasonably completed during the budgeted hours selected. Since there is no low fraud risk situation, this study does not allow for many statements about true efficiency nor potential over-auditing because there is no baseline control group of procedures against which to compare.

3.1.2 Company Information and Manipulation

After reading the consent form, all participants were told they had been assigned as the lead auditor and were responsible for updating the revenue cycle audit program for a medical products company, Precision Equipment, Inc. (Precision). The specific scenario was built to provide sufficient information to allow the participant to develop specific fraud risk hypotheses

from the materials. All participants received the same information regarding the description of the industry, historical company, management, control environment, and revenue cycle. They were told that “computer and manual controls over processing of routine revenue transactions are in place and effective.” They were also informed that during initial audit planning, risk assessments were performed for revenue. The resulting preliminary assessment was moderate for inherent and fraud risk and low for control risk.²¹ See Appendix A for basic case information provided to all participants.

After the revenue cycle information, participants received information about the roll-forward procedures and a newly implemented marketing plan - the first place participants saw different information due to the fraud/no fraud manipulation. See Appendix B for the roll-forward procedures and marketing plan. The main differences between the seeded fraud (no seeded fraud) versions were the dollar amount and timing of the new November (July) marketing program, which increased revenue by \$84 million (\$14 million) and net income by \$35.2 million (\$5.2 million). The fraud scenario roll-forward procedures indicated that revenues and net income for the marketing plan were more than 10.5 and 4.4 times the planning materiality amount of \$8 million, respectively; whereas, the no fraud scenario values were just above and just below the same \$8 million materiality amount. The new plan transferred the selling of analog products to the distributors from Precision employees, so they could focus their time on digital sales. The company ran initiatives and offered incentives to encourage participation but also asked distributors to purchase minimum (suggested) amounts, requiring (offering)

²¹ This represents a substantial modification from the Asare and Wright (2004) and Hammersley et al. (2011) instruments. Their cases put participants in the planning phase of the audit, whereas this study places participants mid-audit where planning procedures, including brainstorming sessions and initial risk assessments, have already been performed.

promissory notes with balloon payments of approximately 70% (20%) after six (twelve) months. The company approved additional credit limit increases if needed in both scenarios. In the fraud scenario only, the company followed up with undecided suppliers to sign them up, made arrangements to hire freight forwarders, and provided warehouse facilities for companies that did not have enough room to store the entire amount of product they were required to purchase.

Participants also received selected ratios and summary financial statements. See Appendix C for side-by-side comparisons. The fraudulent financial statements were modified from the financial statements used in the Hammersley et al. (2011) instrument. The financial statements without the seeded fraud were based on a combination of restated financial statements and the Hammersley et al. (2011) prior year financial statements, so that any prior year balances carried forward properly. The main differences within the financial statements were that the fraud scenario indicated a large increase in revenues and a slight increase in net income and earnings per share; whereas, the no fraud scenario had a smaller increase in revenues and a decrease in net income and earnings per share.

3.1.3 Dependent Variables

Dependent variables were the same for both manipulations; see Appendix D. Participants were first asked to list any risk factors for Precision that would increase the likelihood of material misstatement in preparation for revenue cycle fraud risk assessment, the first dependent variable. The main purpose of this task was to prime the individuals to perform the tasks of interest: the fraud risk assessment and the audit plan modification (Hammersley 2011). Individuals then rated inherent, control, and fraud risk, the variable of interest, on an 11-point Likert scale (0-Low Risk, 5-Moderate Risk, and 10-High Risk). While inherent and control risk are not variables of interest, they were included in the instrument to disguise the true focus of the

study and to prevent demand characteristics.

After assessing risk, participants were asked to update the revenue cycle audit program, as applicable, based on prior year work papers, standard audit procedures that have been rolled forward by a member of their staff, and their updated understanding of the company. For each of the standard procedures provided, participants were asked to choose, based on the risks at Precision, one of five options: (1) omit the procedure as non-applicable; (2) perform the standard procedure and conduct a random sample; (3) increase the sample size due to high risk (i.e., increase extent) and indicate by what percentage to increase; (4) modify the sample to focus or target a particular segment of the population and indicate what percentage of the sample should focus on that group; (5) modify the sample in some other way. To evaluate FJDM quality, two separate dependent variables were created, based on the comparing the participants' answers to a panel, which convened to arrive at consensus benchmark answers for both versions of the case study.²² For the dependent variable related to fraud risk assessments (FRADIFF), smaller differences indicate higher quality FJDM. For the dependent variable related to audit program procedures (APGSCORE), higher values indicate higher quality FJDM. These will be used in separate regression models. Further discussion on how the data were analyzed is provided in section 3.2 Hypothesis Testing.

3.1.4 Independent Variables

When researchers are looking at experience as a differentiator, task-specific experience (e.g., audit area, industry, forensic) is used and measured as “recent concentration on a task or the amount of time working in a task over a career” (Hammersley 2011, 106). Hammersley

²² The benchmark panel is made up of three (3) individuals, two (2) Big4 audit partners and one (1) former Big4 forensic professional and current forensic consultant, professor, and Ph.D. Further discussion regarding the benchmark panel can be found in subsection 3.1.6 Benchmark Panel and in 3.2 Hypothesis Testing.

(2011) notes that while fraud engagement experience is positively correlated with general audit experience, it is a noisy proxy, and she therefore recommends measuring fraud experience rather than audit experience to capture fraud knowledge. However, capturing auditor task-specific experience through the common number-of-fraud-engagement-worked-on proxy (e.g., Rose 2007; Hammersley et al. 2011) also potentially introduces considerable measurement error.

Since experience is an opportunity to gain knowledge (Davis and Solomon 1989), different types of fraud-related experience may result in different knowledge structures, which ultimately result in different judgments. In an attempt to isolate the impact different types (e.g., financial statement fraud, misappropriation of assets, restatements) and levels (e.g., procedure performance, review, planning) of fraud-related experiences have on FJDM, this instrument used 4-point Likert scale self-assessment items (1-No prior experience; 2-Dealt with on a few occasions; 3-Dealt with on a number of occasions; 4-Dealt with this very often). The task experience questions were modified based on a Hammersley et al. (2011) item that asked seniors how much experience they had with revenue recognition issues, using the above Likert scale. Example intentional material misstatement items include: “Performing test work related to potential intentional misstatements while on engagements,” “Reviewing the test work of others related to potential intentional misstatements while on engagements,” and “Advising others regarding audit program development related to specific alleged fraud schemes.” Factor analysis has been performed on these measures to determine final components for the fraud experience independent variable(s).

Another version of the instrument gathered fraud task-specific experience based on billable hours rather than using the Likert scale; otherwise, all other item prompts were the same. In the percentage billable hours version, instead of asking “how much experience over the last 3

years do you have with:” before each item, it asked the participants two alternative questions. First, participants provided the percentage (%) of their billable time over the last three (3) years spent in revenue recognition and accounts receivable, intentional material misstatements, misappropriation of assets, and restatements. Then, participants were asked to allocate those percentages amongst the same categories provided in the other version. In order to analyze these two versions, two independent coders were used to map the responses from the billable hours version onto the Likert scale version.²³

The impact of fraud-related certifications on the dependent variables was measured with an indicator variable. Formal fraud education and informal fraud training were measured using categorical variables. The education variable evaluated whether individuals have taken a college course elective in fraud/forensic accounting, had a minor/concentration in fraud/forensic accounting, received a fraud/forensic accounting certificate, or obtained a master’s degree in fraud/forensic accounting. Informal fraud training asked how many times in the last year the individual has read professional articles, magazines, and/or books in audit or fraud-related areas (never, 1-2 times per year, 4-12 times per year, weekly). Formal fraud training asked subjects to report the number of hours of audit and fraud-related training within the last year and three (3) years.²⁴ These time frames were chosen as auditors report CPE due to reporting timeframes for their professional licenses.

Trait professional skepticism was measured using the Hurtt (2010) Professional Skepticism Scale (HPSS). This scale is built based on a definition that describes professional skepticism “as a multi-dimensional construct that characterizes the propensity of an individual to

²³ See Chapter 4 section 4.1.2 and 4.3 for Cohen’s kappa results.

²⁴ One firm’s requested that three years’ worth of CPE not be collected due to perceived difficulty in answering the question reliably. This was granted and affected a total of six (6) respondents.

defer concluding until the evidence provides sufficient support for one alternative/explanation over others” (Hurtt 2010, 151). During the development of the scale, Hurtt (2010) finds professional auditors have a mean HPSS score of 138.6 (SD 12.6). The professional auditors’ range is 111 to 173 with a possible score between 30 and 180. The instrument was tested and re-tested on professional auditors with an average of 58 months of experience. Retests indicated similar results with a mean of 135.4 (SD 14.7), a range of 105 to 177, and a Cronbach’s alpha of 0.91 (Hurtt 2010). The instrument is made up of six (6) sub-constructs or components:

- a questioning mind (“suspicion, disbelief, or doubt”),
- suspension of judgment (ability to wait for sufficient evidence to conclude),
- search for knowledge (“general curiosity or interest”),
- interpersonal understanding (better understand “motivation[s] and integrity” of auditees),
- self-esteem (belief in self and ability to challenge when necessary), and
- autonomy (ability to make own decisions about evidence) (Hurtt 2010, 152-155).

3.1.5 Control Variables

While the case scenario attempts to hold a number of variables constant such as the client background, prior and current audit history, industry analysis, management, materiality, and the control environment, there are a number of factors that an experiment cannot hold constant. These items were measured as part of the demographics section and included questions such as years of auditing and forensic accounting experience, position title, and type of firm, as well as length of time and type of industry specialization.

General audit experience was measured similarly to fraud-related task-specific

experience.²⁵ Participants were asked to evaluate five statements about performing and reviewing test work, developing and reviewing audit procedures, and responding to requests for assistance from others. Each of these items were focused on revenue and accounts receivable audit plans and test work as that is the audit area focus in the scenario. A factor analysis was performed to determine item loading and retained variables were averaged to arrive at an experience score.²⁶ The variable *Rank* was measured by asking the participant to indicate their position (i.e., associate, senior associate, manager, senior manager, partner, other). There were no associates in the sample and each of the “other” individuals were assigned an estimated rank based on their total years of experience. Each category was assigned a numerical, ordered rank value of zero (0) through three (3) due to insufficient sample size to create a series of dummy variables, with senior associates as the reference group. *Industry* was measured with an open text box and coded as a one (1) if the participant listed manufacturing or healthcare (i.e., industry focus of scenario) and a zero (0) otherwise. *FirmType* was measured by asking the participant which type of accounting or consulting firm they worked at (i.e., Big 4, mid-tier, local/regional, other) and due to insufficient sample size to create a series of dummy variables, was evaluated for inclusion using a Big4/Non-Big4 dummy variable. *ForIndiv* was measured by asking individuals to identify their job function (i.e., auditor, forensic accountant, both) and was coded as a one (1) if the participant marked forensic accountant or both and a zero (0) otherwise. These control variables were expected to be randomized across treatment groups. However, to the extent that one or more of these variables represents a major source of variability for one (but not the other) of the treatment groups, the control variable was included in the applicable regression

²⁵ See sub-section 3.1.4 and 3.3.4 for additional details regarding this measure.

²⁶ See chapter 4 subsection 4.1.2 results of factor loading.

model.

3.1.6 Benchmark Panel

This study makes use of a panel as a benchmark for the participants' responses. The panel was made up of four (4) individuals, two (2) current Big4 audit partners and one (1) former Big 4 forensic consultant and one (1) academic responsible for teaching auditing, corporate governance and financial statement fraud, with an average of 15.8 years of experience. The mean professional skepticism score was 135.33 with a standard deviation of 15.7 (out of a possible score of 30 to 180). The rest of their independent variable responses also indicated a variety of formal and informal fraud education experiences and fraud-related task-specific experience.

The panelists were asked to independently complete both the fraud and no fraud scenario cases. The order in which the scenarios were completed was randomly assigned to each individual. The initial set of panelists were asked to take at least a 15 minute break between the completion of the two cases. After completing each case, the panelists met to discuss the case and their respective answers, as well as determine the consensus benchmarks. One audit partner indicated that it was difficult to separate the two cases, because they were so similar. It appeared that 15 minutes was not enough time to clear the details for the panelists. During the consensus meeting, one of the panel members was more dominant and persuasive than the others. Therefore, it was determined that additional panel members would be selected and given a larger span between the completion of the two cases. These responses from these panel members were combined with the initial responses the original panel members provided and average scores were derived for score computation.²⁷

²⁷ See chapter 4 sections 4.2 and 4.3 for discussion on how the FRADIFF and APGSCORE dependent variables were calculated.

3.1.7 Administration of the Experiment

The experiment was expected to take approximately 30-45 minutes to complete and was administered online via Qualtrics or in a paper-based survey when requested by the participant or firm. Participants taking the survey online received a link via email from either the author or from a firm contact, depending on firm preference. The Qualtrics survey randomly assigned participants to each treatment block through the same link, so roughly the same number of participants was in each treatment. Participants receiving the paper-based survey received an envelope containing a randomly-assigned case study from either the author or a firm contact containing the consent form, the instrument, and a self-addressed stamped envelope.

Participants were recruited through the author's personal contacts, alumni contacts, and directly through firms. In an attempt to get a cross-section of firms and personnel, participants were also solicited at a number of events including a student recruiting event, an annual accounting and auditing conference for regional accounting firms, and a monthly local ACFE chapter meeting. An event in Sioux Falls, SD led to participants from three (3) local/regional firms. Finally, two Big4 firms agreed to assist in providing a majority of the participants.

To encourage participation, two drawings were established. The first offered the ability to register for a prize upon completion of the study. The prize drawing was for three (3) prizes: one iPad, one Amazon.com \$50 gift card, and one \$20 Starbucks gift card.²⁸ The second drawing was for the opportunity to receive an executive summary of the study results. The names and contact information for those wished to be in either drawing were collected in a separate survey and server from that of the experiment data collection to ensure anonymity of the respondents.

²⁸ Individuals who participated directly through their firm did not have the opportunity to participate in the prize drawing.

3.2 Hypothesis Testing

This section describes how each of the following hypotheses, which were developed in Chapter Two, will be tested.

H1a: Individuals with more fraud-related task-specific experience will have more effective fraud risk assessments than those with less fraud-related task-specific experience.

H1b: Individuals with more fraud-related task-specific experience will have more effective audit plan modifications than those with less fraud-related task-specific experience.

H2a: There will be no difference in the effectiveness of the fraud risk assessments between those who have fraud-related certifications and those who have CPA or CA licenses.

H2b: Individuals with a fraud-related certification will modify audit plans more effectively than those who do not have a fraud-related certification.

H3a: Individuals with formal fraud education will have more effective fraud risk assessments than individuals who have not had any formal fraud education.

H3b: Individuals with formal fraud education will have more effective audit plan modifications than individuals who have not had any formal fraud education.

H4a: Individuals with more hours in formal fraud training will have more effective fraud risk assessments than individuals who have fewer hours in formal fraud training.

H4b: Individuals with more hours in formal fraud training will have more effective audit plan modifications than individuals who have fewer hours in formal fraud training.

H5a: Individuals with more informal fraud training will have more effective fraud risk assessments than individuals who have less informal fraud training.

H5b: Individuals with more informal fraud training will have more effective audit plan modifications than individuals who have less informal fraud training.

H6a: Individuals with higher levels of trait professional skepticism will have more effective fraud risk assessment judgments than individuals with lower levels.

H6b: There will be no difference in audit plan modification effectiveness between individuals with higher and lower levels of trait professional skepticism.

3.2.1 Models

A Tobit model analyzes the results for the dependent variable FRADIFF. FRADIFF is the absolute value of the difference between the participant's fraud risk assessment and the mean value of benchmark panel's fraud risk assessment. A Tobit model is appropriate in this study because both dependent variables have upper and lower limits,²⁹ and using Ordinary Least Squares could potentially introduce downward bias in the coefficients (Amemiya 1973).

An ordered-logit model analyzes the results for APGSCORE due to the ordinal nature of the variable. APGSCORE is the cumulative number of audit program guide (APG) procedures the participant chooses that matches the benchmark panel's recommendations, which are calculated separately for each scenario and procedure. Procedure modification choices are: (1) omit, (2) perform standard procedure, (3) increase sample size, (4) modify sample (i.e., target and describe, and (5) modify in some other way. Each one represents an incremental level in auditor effort each procedure. I chose to value each on an increasing scale from 1-5 for scoring purposes while understanding the ordinality of the variable and that numbers do not indicate equal distance between the categories. In addition, those selecting #4 should also describe how to target the sample (i.e., the distributors from the marketing program). Those who mark #4 but did not mention distributors receive a score of 4 (an indication of increased effort), however, those who also properly identify the distributors as the target population receive a score of 4.5.³⁰ Those who selected more than one procedure received a total score of the sum of the procedures selected (e.g., increase overall sample size [3] and target the distributors [4.5] = 7.5).

The mean and standard deviation of the panel for each procedure is calculated and the

²⁹ FRADIFF has a potential range of zero (0) to ten (10).

³⁰ This qualitative data requires manual coding and interrater testing by Cohen's kappa. See results in chapter 4 section 4.3.

range for what determines a participant match is computed as the mean procedure score +/- one (1) standard deviation. Participant selections within the range is scored as a match (1), otherwise zero (0). All of the panelists' additional procedures are selected as possible procedures to match on and are reviewed for possible matches. The dependent variable APGSCORE is calculated as the sum of all matches with higher score representing more effective modifications. How each of the other independent variables are measured is described in sub-sections 3.1.4 and 3.1.5 above.

Model 1 tests hypotheses 1a-6a. The coefficients of interest are $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5,$ and $\beta_6,$ respectively, which are all expected to have negative values. Model 2 tests hypotheses 1b-6b. The coefficients for the variables of interest are $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5,$ and $\beta_6,$ respectively, which are all expected to have positive coefficients. There is no difference predicted for hypothesis 2a and 6b, certifications and trait professional skepticism, respectively. The models are shown below.

$$[1] \text{FRADIFF} = \beta_1 \text{FraudExp} + \beta_2 \text{FrCert} + \beta_3 \text{FrEduc} + \beta_4 \text{CPE} + \beta_5 \text{InfTrain} + \beta_6 \text{HPSS} + \beta_7 \text{FrInd} + \text{Cntrls} + \varepsilon$$

$$[2] \text{APGSCORE} = \beta_1 \text{FraudExp} + \beta_2 \text{FrCert} + \beta_3 \text{FrEduc} + \beta_4 \text{CPE} + \beta_5 \text{InfTrain} + \beta_6 \text{HPSS} + \beta_7 \text{FrInd} + \text{Cntrls} + \varepsilon$$

See Table 3.1 for variable names, descriptions, and potential ways to collapse the variables, if needed. Potential multicollinearity is evaluated through review of Pearson and Spearman correlation tables and calculation of variance inflation factors for variables of concern. Variables that are highly correlated are considered for removal from the model and mean centering.

[Insert Table 3.1 here.]

3.2.2 Additional Tests

The second research question asks how an auditor's fraud detection proficiency interacts

with her professional skepticism. The components of fraud detection proficiency are interacted with trait professional skepticism. They were evaluated as an exploratory research question and addressed in a post hoc analysis.

Finally, the inclusion of both auditors and forensic specialists in this study allows for comparisons of procedure selection between risk levels and the fraud detection proficiency indicators. In order to test this, I first recode each audit procedure from a dichotomous variable (match/no match) to an ordinal variable with three levels measuring whether the selection represents more, less, or the same amount of audit effort as the panel's selection (over-auditing, under-auditing, or match). The same procedure selection scoring method as APGSCORE is used. The participant score is compared to the benchmark panel average selection +/- one (1) standard deviation. Participant scores lower than the panel's range are coded as under-auditing (-1). Participant scores within the panel's range are coded as a match (0) and score greater than the panel's range are coded as over-auditing (+1). The dependent variable, OUMSCORE, is calculated as the sum of all the procedures. Higher positive scores represent over-auditing and lower, negative scores represent under-auditing. This post hoc exploration of the final research question will provide evidence with regard to the risk of over-auditing.

3.3 Pre- and Pilot Testing

3.3.1 Pre-Test #1

3.3.1.1 Pre-test and Debrief

The first version of this instrument was run for time and readability using 22 junior-level auditing students. A number of mechanical issues were discovered during the pre-test, including failed manipulation checks and instrument length. The average time to complete the instrument

was approximately 35 minutes, with a range of 24 to 47 minutes in length. Since the target sample for this instrument was managers and above, the ideal instrument length is less than 30 minutes. Suggestions from the debrief session resulted in streamlining the overview of the revenue cycle. In addition, participants seemed to pick up on the general risk cues regarding management compensation, consecutive quarters increasing income, declining industry, and analog versus digital sales. They also detected the specific fraud cues about the November marketing plan. However, not many of them could remember their specific revenue and net income numbers (to discern whether they were in the fraud or no fraud scenario). After further consideration, the marketing plan seemed to read as though fraud risk was higher than either was intended or the financial statements indicated. Also, the debrief indicated the need to add another field to differentiate between fraud and no fraud audit plan modifications when targeting the sample. The expert panel recommended modifying positive accounts receivable confirmations to target a portion of the sample to include distributors involved in the marketing plan (50% of distributors in no fraud scenario and 100% in the fraud scenario). Based on the pre-test #1 version, the participant might fill in enough information to differentiate that level of detail. However, there was nothing that would prompt the participant to provide enough detail so that the results could be evaluated to determine if the auditor was spending too much or too little time on the targeted sample.

3.3.1.2 Summary of Changes

As a result, adjustments were made and discussed with an audit professor and a Ph.D. student who was previously a Big4 audit manager. Based on the results of the pre-test #1, unneeded financial statements, ratios, and language were cut from the instrument to decrease

time commitment. Two manipulation check questions were rewritten. The marketing plan in the no fraud version was softened to reduce the fraud risk level. And finally, text boxes were added to the audit plan modification dependent variable to capture additional information about the percentage increase (amount) in audit sample size, as applicable.

The Statement of Cash Flows was excluded from the instrument in the interest of time. The fraud in this case had no impact on overall cash flows or net cash flows from operations, only on net income and the net effect of changes in current assets and current liabilities. As such, despite the sense of realism a Statement of Cash Flows would add to the case, it would likely have minimal impact on the auditors' fraud planning activities. Selected ratios from the financial statements section were cut from 12 ratios down to four (4) ratios (profit margin, current ratio, inventory turnover, accounts receivable turnover). This allowed the participant to compare the company's ratios with the industry analysis provided earlier in the instrument but not to waste time on extra ratios. Since the company uses standard internal controls, the revenue cycle overview section was reduced. It was still thorough enough to show controls were sufficient but not so long that participants spent time looking for problems that do not exist.

With regard to the marketing plan (i.e., method of communicating the manipulation other than through the roll-forward tests and financial statements), pre-test #1 indicated additional changes were needed. First, the length of this section was cut. However, due to its importance, care was taken not to lose any of the important details. Therefore, auditors were still able to generate fraud scheme hypotheses. Second, the marketing plan was softened in the no fraud scenario to decrease the fraud risk and better align the risk level with the financial statements. Rather than implementing the marketing plan in late 2012, the plan was implemented in mid-2012 (July). In addition, references to minimum purchase amounts and required promissory

notes with balloon payments (70%) were softened to proposed purchase amounts and offered promissory notes with smaller balloon payments (20%). Other references in the no fraud scenario were removed in order to decrease fraud risk level, including undue pressure to sign up for the program, freight forwarders, and warehouse facilities provisions. Finally, two new manipulation checks were written. One question asked individuals whether this marketing plan was started mid-year (yes/no), and the other asked whether the program required a promissory note (yes/no).

The final change made to the instrument as a result of pre-test #1 was to the audit plan modification dependent variable section. This section was originally set up to capture whether an individual would omit, perform standard procedure, increase sample size, modify (target) sample, or modify in some other way. However, within the two scenarios (fraud versus no fraud) there was no guarantee that the analysis would be able to capture intended differences between two groups. As a result, the instrument was modified to include an additional text box next to the increase sample size option to ask the participant to enter by what percentage they would like to increase the sample size. Also, since the marketing plan did not exist in the prior year, the additional text box for the target sample modification option asked the participant to describe the target sample and what percentage of the sample they would like to focus on that group.

3.3.2 Pre-test #2

Another pre-test with 13 Ph.D. accounting students was run to test for readability, time, and manipulations. During the pre-test debrief and as the fraud risk assessments in Table 3.2 Panel A indicate, there was some evidence that the no fraud scenario had lower fraud risk, but there were still some adjustments that needed to be made in the pre-test #2 version. The no fraud scenario showed a mean fraud risk assessment of 4.7 (s.d. 2.21) versus the mean of 7.0 (s.d. 2.61) for the fraud scenario. However, discussion indicated that these auditing and accounting

professionals were picking up on cues that were not intended as such, including a large increase in debt. Additional changes were made as a result. A manipulation check question was clarified, financial statements were condensed and modified, and the experience measure was changed to percentage billable time to decrease ambiguity among different firm types and job functions. The experience measure was tested by four (4) Ph.D. students and practitioners and minor layout modifications were made.

[Insert Table 3.2 here.]

The changes range from minor details, such as adding the Affordable Care Act to increase realism, to the industry description to major details regarding preliminary risk assessments to ensure all participants start from the same anchor point. In addition, the two manipulation questions were cleaned up and emphasis was added to improve results. See Table 3.2 Panel B. The main manipulation check question was clarified from “mid-year” to “July” to improve results and to be consistent with the wording used throughout the case. The second manipulation check question remained the same, but bold formatting was used on the word **required** to bring the reader’s attention to it.

The two major changes that came as a result of pre-test #2 were the summarization and modification of the financial statements and the experience measure. During the debrief it seemed as though some line items caused more concern than intended even though they were not involved in the fraud scheme. As a result, some of these numbers were modified and carried forward throughout both scenarios as long as the changes did not impact the overall case story. In addition, the income statements and balance sheets were condensed to show only basic categories and percentages. Different versions were shown to two Ph.D. students and a faculty member before settling on a final format.

The second change, the experience measure, was created from a single question on the Hammersley et al. (2011) questionnaire, which asked “how much experience do you have with revenue recognition issues” on a Likert-scale from 1-No prior experience to 4-Dealt with on a number of occasions to 7-Dealt with this very often. This series of items raised a number of questions due to the lack of clarity on how to define “a number” or “very often,” as well as how to differentiate between numbers with no descriptions at all. Further, given the target sample included a wide variety of individuals (local versus international firms; one client versus multiple clients all year), this measure introduced potential error, as it was measuring discrete numbers of experiences rather than length of time spent on those experiences. In an industry where time spent on clients varies so much, this may have an impact on the experience gained. For example, there is an item “developing audit program procedures related to revenues and accounts receivable while on engagements.” Answers from participants who work year round on small clients may not be comparable to those from participants who work on the same client all year.

As a result of these concerns, a measure built on billable hours (as described in subsection 3.1.4) was devised. This design choice eliminates the noise introduced with the vague Likert-scale and asks participants to estimate the amount of time they spend on certain activities. While this method also introduces memory and estimation measurement error, it puts the participants on a scale based on proportional time spent on an activity. This question was field tested on four (4) Ph.D. students and practitioners and resulted in minor layout modifications.

3.3.3 Pilot Testing

The final instrument was pilot tested on 30 senior level auditing students and audit practitioners to test the functionality of the final revisions and new manipulation checks. Successful responses to the manipulation checks indicated that the main manipulation check

question (i.e., marketing plan started in July) was working with t-value of 4.417 ($p < 0.0001$). See Table 3.3. However, the secondary manipulation check required the reader to distinguish between whether the company's marketing program **required** distributors to sign a promissory note or not. In hindsight, this was a much subtler fraud cue that was only mentioned once. On the other hand, the timing of the marketing program was reiterated five (5) times. Based on this, only the results of the first manipulation check were used to screen participants for suitability relating to manipulation checks going forward.

[Insert Table 3.3 here.]

3.3.4 Firm Risk Management and Specialized Versions

In order to gain participants at two of the Big4 accounting firms, the final instrument underwent risk review before being approved for distribution to employees. Subsequent to the commencement of data collection, additional modifications were required in order to gain access to individuals from firms with rigorous risk mitigation procedures. This sub-section details those changes.

Some changes were minor. The second firm requested all demographic questions be labeled as optional and allow for individuals to provide answers within ranges rather than as a numerical value.³¹ Other changes related to clarifying the two education independent variables. This added information to provide examples of what types of topics would be included in that particular area, for example: “**audit risk assessment and planning topics**, e.g., audit risk assessments, audit planning and materiality, internal controls, audit procedures, professional skepticism.” Most of the changes related to ensuring there was no way to tie a response back to

³¹ All other participant data was coded to match these ranges.

an individual. For example, neither firm's employees participated in the prize drawing for survey completion. However, their employees could register to receive the executive summary of the results by sending their contact information to a point contact within their firm, rather than directly to the author, to further ensure anonymity. The author would then send the results directly to the firm contact. In addition, one firm requested paper surveys with instructions for participants to refrain from including return addresses on the self-addressed stamped envelope.

One change was major. This related to one firm and the task-specific experience independent variable. The firm was not comfortable with their participants providing estimated billable hours related to potential misstatements and asked for alternative measures. A new measure modified from the original pre-test Likert-scale but with only four (4) options was developed. See sub-section 3.1.4 for details. This measure loses data compared to the billable hours measure, but due to the similarities, the billable hours data were mapped onto this measure by two independent coders in order to maximize sample size.³²

³² See Chapter 4 section 1 for discussion and Chapter 4 section 4.1.2 and 4.3 for Cohen's kappa results.

CHAPTER FOUR: ANALYSIS AND RESULTS

This chapter discusses the methods used to test the hypotheses in this study. Section 4.1 describes the preliminary analyses, including participant demographics, manipulation checks, Cohen's kappa testing, factor analyses, and descriptive statistics. Section 4.2 presents the hypothesis testing results for the fraud risk assessment dependent variable (FRADIFF). Section 4.3 summarizes the hypothesis testing results for the audit program modification dependent variable (APGSCORE). Section 4.4 and 4.5 explain the results of each of the exploratory research questions.

4.1 Preliminary Analysis

4.1.1 Demographics and manipulation check

As described in chapter 3, participants were obtained from a variety of sources including conferences, personal contacts, and firm participation. These avenues yielded approximately 345 potential participants who received an email with a link to the instrument or a paper study from me or a firm contact along with a consent form and instructions. From these, 51 participants completed the instrument, representing a 14% response rate.

This study focuses on an audit modification scenario. As a result, the participants were audit and forensic professionals currently or recently employed at public accounting firms. As seen in Table 4.1, approximately 20% of these individuals are classified as a forensic professional or both as an auditor and as a forensic professional, while the remaining 80% as an auditor only. Approximately 39% came from Big4 firms and more than 70% of the sample was made up of participants at or above the manager rank and was fairly evenly split across levels. Further, the vast majority of the sample had a CPA or CA license (93.7%) and 12.5% indicated they had at least one fraud-related certification. Only 5.9% indicated that they had any formal

fraud education (e.g., college/university course, certificate, undergraduate major/minor, master's degree). As such, the variable *FrEduc* was removed from the analyses (H4a, b) due to lack of participants. Finally, 68.6% of the sample had at least six (6) years of audit experience versus 15.7% for forensic experience. However, this was not unexpected given that forensic professionals only make up 20% of the sample and auditors do not typically get many opportunities during their career to spend time working as a (or with) forensic professional(s) (e.g., Loebbecke et al. 1989; Gold et al. 2012).

[Insert Table 4.1 here.]

This study involves one manipulation, high fraud risk (seeded fraud) and lower fraud risk (no seeded fraud). To test the validity of the risk level, a manipulation check was designed to capture whether individuals recognized one of the main red flags, timing of the new marketing plan, which is where the fraud was committed. Responses indicated that the question was working with a t-value of 6.56 ($p < 0.0001$). See Table 4.2.

[Insert Table 4.2 here.]

4.1.2 Data preparation

In order to perform the analyses in this study, some qualitative coding, coding continuous variables into categorical variables, and re-distribution of existing categories was performed. The formal fraud training (*CPE*) variable was also recoded for respondents who provided an estimate of their *CPE* hours over the last year to code their answers within the appropriate categorical ranges, which was asked in place of the hours estimate for one firm.

In addition, items for two variables, fraud-related experience (*FraudExp*) and general audit experience (*GenAudExp*) were measured in two different ways (billable hours and through

a Likert-scale) due to a participating firm's request.³³ This necessitated judgmentally coding percentage of billable hours onto the Likert-scale where 1=No prior experience, 2=Dealt with on a few occasions, 3=Dealt with on a number of occasions, and 4=Dealt with very often. The Likert-scale of the experience variables is an ordinal scale and do indicate increasing experience levels, thus indicating increasing degree of disagreement (Sim and Wright 2005). Therefore, a weighted kappa would typically be appropriate. However, Sim and Wright (2005) also note that while kappa can be used on ordinal scales converted from continuous data, it is not typically recommended. However, in this case, keeping the data in its preferred continuous form was not an option due to data limitations from a subset of participants who did not answer in continuous form. Therefore, a weighted kappa test was undertaken. Two coders rated each of the three samples, the author and a Ph.D. student. The Ph.D. student is a former senior associate auditor with four years of experience, making him qualified to understand and code the data at hand. The kappa test on the experience fields indicate almost perfect agreement with a kappa of 0.947 ($p < 0.0001$, CI = 0.8912, 1.0038) (Landis and Koch 1977).

An oblique (Promax) factor analysis was run for the items for the experience variables (*FraudExp* and *GenAudExp*) and the items from Hurtt's Professional Skepticism Scale (*HPSS*). See Table 4.3. The factor analysis was reviewed for factor loadings less than 0.5 for consideration of removal. Based on the results of the factor analysis, three (3) items were maintained for *GenAudExp* and four (4) items for *FraudExp*. Each latent variable was calculated using the mean of the related items. There are a number of crossloadings and items with loadings less than 0.5. *HPSS* items 10, 18, and 25 are all less than 0.5. *HPSS* items 28 and 11 also have

³³ See Chapter 3, section 3.3.4 for additional details.

marginally low loadings (0.505 and 0.576, respectively) and crossload on other factors. This could be a function of small sample size or my particular sample. Hurtt (2010) noted that in her scale, which was designed to provide a single score and where Cronbach's alpha indicates internal consistency of the subconstructs and the scale as a whole is strong, does not indicate a problem. Cronbach's alpha for the overall scale is 0.847 and the subconstructs range from 0.745 to 0.900, above the acceptable rate of 0.70 (Nunnally 1978). As such, all 30 items remained in the HPSS calculation.

[Insert Table 4.3 here.]

4.1.3 Tests of assumptions and descriptive statistics

The general linear regression makes four assumptions: linearity, a normal distribution, homoscedasticity of variance, and error independence. These were tested visually using scatterplots, boxplots, histograms, and quantile-quantile plots (Q-Q plots). Normal Q-Q plots for the APGSCORE model indicate that the residuals are fairly normally distributed (Figure 4.1 panel B). However, Q-Q plots for the FRADIFF model indicate a slight positive skew within the data (Figure 4.1 panel A). Histograms of the standardized residual and scatterplots of the standardized residual by predicted values were evaluated for indications of linearity, normality, and homoscedasticity. See Figure 4.2 for the histograms and scatterplots related to the homoscedasticity and normality tests. The FRADIFF model depicts a right-skewed histogram (panel A). However, the scatterplots of the FRADIFF model indicate non-linearity and heteroscedasticity with a negative bias. The APGSCORE model indicates the fraud scenario data is not normally distributed but is fairly homoscedastic (panel B).

[Insert Figure 4.1 and Figure 4.2 here.]

The survey randomly allocated participants to either the fraud or no fraud scenario. This should have taken care of potential clustering around the type of groups the data was collected from. Independence errors were evaluated on two potential causes of spatial clustering, firm type and rank.³⁴ Each of these variables were evaluated visually for residuals that tend to group together. Error independence box plots are depicted in Figure 4.3. Within the APGSCORE model (Panel B), the amount of median variability within each group is approximately the same with the exception of mid-tier firm individuals and partners in the fraud scenario. Dispersion of the residuals for the local/regional participants as well as in the senior associates and senior managers in the fraud scenario exist indicating a clustering effect. Within the FRADIFF model (Panel A) there is more variability in both the median and dispersion of the data in both scenarios indicating a clustering effect. The recommendation for correcting this is to create dummy variables to indicate group membership. However, this was not performed in this study due to limited sample size and degrees of freedom. Overall independence of errors was evaluated using the Durbin-Watson test. Values ranged from 1.919 in the FRADIFF model to 2.279 in the APGSCORE model. Values closer to two (2) indicate the assumption of independence of errors is reasonable with values less than one or greater than 3 requiring additional investigation (Field 2013). Based on this the independence of errors assumption appears to be met.

[Insert Figure 4.3 here.]

Outliers were identified through a series of visual and statistical tests. The tests separately evaluate outliers for the fraud and no fraud sample for both the FRADIFF and APGSCORE models. Boxplots of each predictor variable provided the first visualization of potential outliers

³⁴ Serial dependency (i.e., time effects) was not evaluated as there were no repeated measures within this study's design.

of note (Figure 4.4). I also ran regression diagnostics to statistically identify individual cases of high distance (externally studentized residuals), leverage (centered leverage values), and overall case influence (standardized DFFIT, i.e., change in predicted value when the i^{th} case is deleted) [not tabulated]. Absolute externally studentized residuals were reviewed for cases with values greater than two (2) (Cohen et al. 2003). Leverage values in SPSS range from zero (0) to one (1) with values closest to one (1) having the largest leverage. Values greater than 0.5 were reviewed to identify those with the highest leverage impact. Finally, absolute standardized DFFIT values above three (3) were also examined. Since these values represent overall case influence (i.e., effect of distance and leverage), this statistic was the main focus in the evaluation of whether a particular variable was removed from the sample (Cohen et al. 2003). The models were reevaluated subsequent to the removal of each case with an absolute value above three (3). This iterative process resulted in identifying two (2) cases in the fraud scenario for potential removal in the APGSCORE model and no cases from the FRADIFF model.³⁵

[Insert Figure 4.4 here.]

Descriptive statistics for are detailed in Table 4.4 and the Pearson correlation coefficients are in Table 4.5. There is one (1) Pearson correlation with absolute values greater than 0.5 and four (4) greater than 0.4. However, there are none that are greater than 0.90. The largest is forensic individual (*ForIndiv*) with fraud certifications (*FrCert*) at 0.78, which is expected to be highly correlated and could lead to multicollinearity issues in the models. The *ForIndiv* variable (uncentered) has the highest variance inflation factor (VIF) at 3.516 when included in the FRADIFF model and 3.056 in the APGSCORE and OUMSCORE models, respectively. The

³⁵ When using the same iterative process for the FRADIFF model, the removal of the most influential cases resulted in an escalation of SDFFIT values for a number of cases that were not previously identified as being influential. As a result, no individual cases were removed for the FRADIFF models.

average VIF for all variables (uncentered) is 1.45. The general rule of thumb recommends that no individual variable have a VIF greater than ten (10) (Field 2013). Cohen et al. (2003) think the recommendation is too high and should be lower (no alternative provided) for the behavioral sciences.

[Insert Table 4.4 and Table 4.5 here.]

4.2 Fraud Risk Assessment Model Analyses

The hypotheses regarding the fraud risk assessment were tested using the absolute value of the difference between the participant's fraud risk assessment and the mean value of the benchmark panel's fraud risk assessment (FRADIFF). For this dependent variable, a smaller difference indicates a more effective fraud risk assessment. The panel's mean assessment was 6.75 and 7.33 for the fraud and no fraud scenarios, respectively. While this is in the opposite direction expected, there are possible reasons for this occurrence. First, revenue is a high fraud risk audit area in general and therefore, could be subject to demand effects regardless of the cues provided. Second, both of the scenarios are created from the same company with only details regarding the fraud, or lack thereof, changed. That coupled with the quick turnaround for completing both case scenarios may have caused the panelist to anchor on facts from the previous case when assessing risk.

[Insert Figure 4.5 here.]

Based on the way FRADIFF is calculated, it is subject to upper and lower bounds. As a result, the data will tend to be censored around these points. In this study, review of the histogram for FRADIFF (see Figure 4.5) indicates a higher number of participants with values closer to zero (0), as expected. Therefore, a Tobit multiple regression model was originally planned to analyze the results for this dependent variable. However, in light of the smaller

sample size and tests of assumptions above, ordinary least squares (OLS) regression was used. To evaluate the FRADIFF hypotheses (H1a, H2a, H4a, H5a, and H6a) three models were evaluated. The following is based on the original model but removes β_3 due to lack of individuals with formal education. In addition, H2a could not be tested in its original hypothesized form because all of the individuals with fraud certifications also have a CPA or CA license. Therefore, there is no variability available to determine whether there is any difference in the effectiveness in the fraud risk assessments of these two types of individuals. Instead what is tested in the model (β_2) is whether those individuals who have a fraud certification are more effective in their fraud risk assessments than those who do not possess a fraud certification.

$$[1] \text{FRADIFF} = \beta_1 \text{FraudExp} + \beta_2 \text{FrCert} + \beta_4 \text{CPE} + \beta_5 \text{InfTrain} + \beta_6 \text{HPSS} + \beta_7 \text{FrInd} + \text{Ctrls} + \varepsilon$$

In order maximize degrees of freedom and to create the most parsimonious model possible, which control variables would be included in this model was determined based on contribution to the explanatory impact each variable would have. This was evaluated using a two-step model process. An initial model was evaluated containing the independent variables of interest. Second, the backward stepwise method was used to evaluate the contribution the excluded control variables would contribute if added to the model. In the FRADIFF model, none of the potential control variables were statistically significant enough to increase the explained variance, as a result, the model evaluated included just the independent variables and the indicator variable that distinguishes which scenario the participant completed (*FrInd*).

The model explains 28% of the variance in this sample and has an adjusted r^2 of 16%. Further, for every one (1) standard deviation (SD) increase in informal fraud training (*InfTrain*) is associated with an increase of 0.43 ($p < 0.01$) standard deviations in the predicted value of

FRADIFF. In other words, the more informal training on fraud, the further away the participant's fraud risk assessment score is from the panel's (H5a not supported). See Table 4.6. However, *FrCert* and *HPSS* are marginally significant in the hypothesized direction. A one (1) SD increase in *HPSS* leads to a decrease of 0.229 ($p=0.07$) in the predicted value of FRADIFF bringing individuals more in line with the panel's assessment (H2a supported). A one (1) SD increase in *HPSS* leads to a decrease of 0.252 ($p=0.06$) in the predicted value of FRADIFF bringing individuals more in line with the panel's assessment (H6a supported). Finally, neither of the other two independent variables (fraud experience and formal training) support the hypotheses that these indicators will have more effective fraud risk assessments than those without the individual indicators. I explore the findings of this data in Chapter 5.

[Insert Table 4.6 about here.]

In evaluating the data further, the coefficient for the variable that indicates which scenario the participants were assigned to is significant ($b = 0.299$, $p=0.03$). This indicates that the predicted value of FRADIFF is 0.299 SD higher (i.e., further away from the panel assessment) for individuals in the no fraud scenario ($FrInd=1$) than those in the fraud scenario. Therefore, there appears to be something different between the scenarios that the fraud indicator variable is picking up, which would be predicted by the variables of interest if the two scenarios were evaluated separately. This possibility should be explored further with a larger sample size by splitting the file by scenario type.

4.3 Audit Program Modification Models

The hypotheses regarding the modifications to the audit plan were tested using a quantitative additive score based on the number of audit plan procedure modifications that matched the benchmark panel's recommendations. The panel's recommendations were

calculated separately for each scenario and each procedure. Each procedure had the same options assigned to it: (1) omit, (2) perform standard procedure, (3) increase sample size, (4) modify sample size (i.e., target) and describe, and (5) modify in some other way. As each of these procedures represents an incremental level in auditor effort each procedure was valued on an increasing scale from 1-5. However, while this variable is ordinal in nature in that it has rank, the numbers do not indicate equal distance between the categories.³⁶

The mean and standard deviation of the panel for each procedure was calculated and the range for what would determine a participant match was computed as an 80% confidence interval of the mean procedure score (Beecham et al. 2005; Emam and Jung 2001). If the participant's selection falls within that range the procedure is scored as a match (1) and if not it is scored as a zero (0). All of the panelists' additional procedures were selected as possible procedures to match on and were reviewed by the author for possible matches. The dependent variable APGSCORE was then calculated as the sum of all matches with higher score representing more effective modifications.

Due to the ordinal nature of the categorical dependent variable, APGSCORE, a traditional ordinal logistical regression model in SPSS 22 was initially used to analyze the data with regard to hypotheses H1b, H2b, H4b, H5b, and H6b.

$$[2] APGSCORE = \beta_1 FraudExp + \beta_2 FrCert + \beta_4 CPE + \beta_5 InfTrain + \beta_6 HPSS + \beta_7 FrInd + Cntrls + \varepsilon$$

³⁶ This qualitative data also required manual coding and interrater testing by Cohen's kappa. DIST was coded as a yes/no box to capture whether the text mentions targeting the sample due to the new marketing plan or distributors in any manner. The same two coders were used. The DIST and PERC scales are categorical in nature and do not have a "degree of disagreement" (Sim and Wright 2005, 259). The coders agree or they do not, therefore, an unweighted kappa was used. The results of the DIST interrater reliability indicate kappa is 0.883 (p<0.0001, CI = 0.8046, 0.9614). The null hypothesis is rejected and a rating of 0.883 indicates almost perfect agreement (Landis and Koch 1977).

First, model fit was assessed. In evaluating the change in the -2LogLikelihood from the intercept only model to the final model including all of the independent and control variables. The traditional ordinal logistic regression model has a Chi-square of 34.162, $df=18$, $p=0.012$ (not tabulated). This indicates the full model predicts the level of procedure modification effectiveness better than the intercept only model. Secondary goodness-of-fit tests include the Pearson and Deviance Chi-square tests, which are intended to test whether the participant data fits well with the predicted model. Both tests contain p-values >0.05 indicating good fit. However, according to SPSS 22 Help, these tests are sensitive to models with large numbers of empty cells due to continuous covariates or a large number of categorical predictors. This model includes three (3) scale variables and 11 categorical variables and 336 (88.9%) empty cells. Therefore, the pseudo r^2 is also evaluated. This model indicates the Nagelkerke (1991) pseudo $r^2 = 0.566$. The model also indicates “unexpected singularities in the Fisher information matrix” with potential “quasi-complete separation” in the data. Based on the limited dataset and quasi-complete separation caused by one or more predictor variables that almost perfectly predicts APGSCORE, some parameter estimates and standard errors will trend towards infinity since a maximum likelihood estimate does not exist for that variable (SAS 2006). Possible corrections for this problem include removing the variable causing the separation, collapsing continuous variables into categorical variables, or using an exact logistic regression (SAS 2006).

In addition, the assumption of proportional odds (parallel lines) is violated (Chi-square = 174.74, $df=126$, $p=0.003$). This means the model with individual estimates for each threshold predicts better than the model that assumes parallel lines. To confirm, bivariate graphs were run on the categorical variables with the dependent variable (see Figure 4.6). It is noted that all but three are clearly not parallel. Based on the bivariate graph results, modeling APGSCORE as a

traditional ordinal regression model is likely producing untrustworthy results. Potential corrections for this problem for this study include running a multinomial logistic regression where APGSCORE will be treated as an unordered categorical outcome variable or using a generalized ordered logistic regression, which allows the predictor coefficients to vary at each level (Long and Freese 2006). Another option would be to treat the dependent variable APGSCORE as a composite score where the distance between each of the score changes is equal.³⁷ While changing the underlying categorical nature of the components of APGSCORE (i.e., a series of match or no match variables for each procedure) into a sum score scale does not turn the variable into a continuous variable there is some support in the corporate social responsibility literature for treating these types of dependent variables as a continuous variable so that ordinary least squares (OLS) multiple regression can be used (Waddock and Graves 1997; Nelling and Webb 2009). A generalize ordinal logistic regression would be the most appropriate model in this situation however due to this study's number of variables and limited degrees of freedom I ran an OLS linear regression.

[Insert Figure 4.6 here.]

Similar to the FRADIFF model, in order maximize degrees of freedom and to create the most parsimonious model possible, which control variables would be included in this model was determined based on contribution to the explanatory impact each variable would have by using the same two-step model process. An initial model was evaluated containing the independent variables of interest. Second, the backward stepwise method was used to evaluate the contribution the excluded control variables would contribute if added to the model. In the

³⁷ For example, the difference between a participant modifying a total of two (2) audit program procedures and three (3) audit program procedures the same as the benchmark panel, i.e., two (2) or three (3) matches, is the same as the difference between obtaining six (6) and seven (7) matches.

APGSCORE model, two of the potential control variables were statistically significant enough to increase the explained variance, as a result, the model evaluated included the independent variables, the *FrInd* indicator variable, as well as *MfgHC* and *AuditExp* as control variables.

The model explains 35.5% of the variance in this sample and has an adjusted r^2 of approximately 17.4%. See results in Table 4.7. With regard to the hypotheses, *FraudExp* ($b=0.303$, $p=0.03$) and *FrCert* ($b = -0.375$, $p=0.02$) are statistically significant. This indicates that a one (1) SD increase in *FraudExp* is associated with an increase in 0.303 SD in an individual's APGSCORE, which provides support for H1b. However, *FrCert* is statistically significant in the opposite direction of the hypothesis suggesting that individuals with fraud certifications are associated with a 0.375 SD decrease in APGSCORE. In other words, individuals with certifications are on average match the audit plan modifications of the benchmark panel 0.375 SD fewer times than those who do not have a fraud certification. Therefore, H2b is not supported. Neither of the other fraud detection proficiency variables (*CPE*, or *InfTrain*) or professional skepticism are statistically significant. However, industry ($b = -0.385$, $p=0.02$) and audit experience ($b = -0.252$, $p=0.08$) have a negative impact on the effectiveness of individual modifications. Unlike the findings in the fraud risk assessment results, the variable, *FrInd*, which indicates which scenario the participant completed is not statistically significant. Possible reasons for these findings will be explored further in Chapter 5.

[Insert Table 4.7 here.]

4.4 Relationship between Professional Skepticism and Fraud Detection Proficiency

The second research question focuses on the relationship between an individual's fraud detection proficiency indicators and their level of professional skepticism particularly as it relates to how they evaluate fraud risk and modify audit plans. Once again, this was tested using an OLS

regression model. All scale variables were mean centered for interaction testing. Furthermore, fraud detection proficiency variable interaction terms were evaluated for inclusion using the same two-step process as in the previous two models. Results are presented in Table 4.8 and Table 4.9 and discussed below.

[Insert Table 4.8 and Table 4.9 here.]

To evaluate the improvement in the FRADIFF models, I compared the change in r^2 from the original model presented in Table 4.6 to this model. The interaction model improved increased r^2 0.05 from 0.28 to 0.33 however, this did not represent a statistically significant increase ($p=0.51$). Dissimilar to prior models, the model suggests individuals in the no fraud scenario are no longer statistically different than those in fraud scenario. Results also indicate *FrCert* is no longer significant as a main effect, however, the interaction between *FrCert* and *HPSS* is significant ($b=0.329$, $p=0.02$). However, *InfTrain* as a main effect ($b = 0.435$, $p<0.01$) and its interaction variable with *HPSS* ($b = -0.280$, $p=0.08$) are also significant. Finally, this model suggests *CPE* ($b=0.282$, $p=0.07$) is marginally significant in the opposite direction as hypothesized in the original model.

Table 4.9 reflects the results of the audit program modifications. Adjusted r^2 increased 0.08 from 0.335 to 0.411, which represents a statistically significant improvement ($p=0.05$). *FraudExp*, *MfgHC*, and *AuditExp* are qualitatively consistent with the non-interaction APGSCORE model, however, *FrCert* is no longer statistically significant. In addition, while *CPE* and *HPSS* are still non-significant, the interaction of the two variables is statistically significant ($b = -0.377$, $p=0.03$). The potential implications of these findings will be discussed in Chapter 5.

4.5 Relationship between Over-auditing and Fraud Detection Proficiency

The third research question explores whether there is a relationship between fraud detection proficiency and over-auditing. If so, then it may be worth examining staffing engagements with individuals with fraud detection proficiency. In order to test this, I first recoded the audit plan modification scoring for each of the procedures from a dichotomous variable (match/no match) to whether the participant's modification was more, less, or the same amount of audit effort as the panel's selection (over-auditing, under-auditing, or match). I used the same procedure selection scoring as in the APGSCORE hypothesis testing (see Section 4.3) and compare the participant score to the benchmark panel average selection +/- one (1) standard deviation. If the participant's score is less than the floor of the panel's range the modification was coded as under-auditing (-1). If the participant falls within the panel's range, the score was coded as a match (0) and if the score is greater than the ceiling of the panel's range, the score was coded for over-auditing (+1). The dependent variable, OUMSCORE, was then calculated as the sum of all the procedures with higher positive scores representing over-auditing and lower, negative scores representing under-auditing. This results in an ordinal dependent variable. As such, a traditional or generalized logistic regression is appropriate.

In order to tease out the over-audit effect I ran the traditional ordinal logistic regression on each of the procedures for the fraud and no fraud samples. The results indicated complete or quasi-complete separation in each model, causing coefficients and error terms to trend towards infinity (not tabulated). As a result, I ran an OLS linear regression similar to how the APGSCORE hypotheses were tested in section 4.3.

The results in Table 4.10, indicate the model explains 34.2% of the variance in this model and has an adjusted r^2 of 0.207. Further, individuals with fraud certifications are marginally more

likely to have higher predicted values of over-auditing ($b=0.207$, $p=0.09$). In addition, individuals in the no fraud scenario are associated with an increase in the predicted value of under-auditing ($b= -2.979$, $p=0.07$). Finally, every increase in rank is also associated with an increase in the predicted value of over-auditing ($b = 0.469$, $p<0.01$). The possible ramification of these findings and potential future research will be addressed in Chapter 5.

[Insert Table 4.10 here.]

CHAPTER 5: DISCUSSION AND CONCLUSION

The final chapter focuses on four main areas. In the first three sections, I answer the research questions within the context of the results presented in Chapter 4. In section 5.4, I present the contributions of the study. Finally, I close with limitations and future research in section 5.5.

5.1 How do Indicators of Fraud Detection Proficiency Impact an Individual's Ability to Adequately Assess Fraud Risk and Modify Audit Plans?

5.1.1 Fraud Risk Assessments

This study examines the impact fraud detection proficiency indicators have on an individual's fraud risk assessment in situations where there is a fraud present and where one is not present. Research indicates mixed results with fraud risk assessments depending on whether individuals are evaluating generic fraud risks (e.g., Pincus 1989; Hackenbrack 1993; Zimbelman 1997) or specific fraud risks (e.g., Asare and Wright 2004; Hammersley et al. 2011; Hoffman and Zimbelman 2009). In this study, both scenarios provide participants with specific details about the company and their fraud risks, which should allow them to adequately assess fraud risk. The open question is whether individuals with indicators of fraud detection proficiency are able to assess fraud risk more effectively than those without those characteristics.

This study tests whether individuals who possess indicators of fraud detection proficiency are more effective at assessing fraud risk than those who do not. These predictions are primarily drawn from literature and expectations that additional domain-specific experience (e.g., Wright 2001; Hammersley 2006), certifications (e.g., ACFE 7/23/2013 website), formal fraud training (e.g., Chen et al. 2008), and informal fraud training (e.g., Rose et al. 2012) increase performance and lead to more effective fraud risk assessments. Generally, fraud detection proficiency

indicators are either non-significant or individuals who possess these characteristics assess fraud risk less effectively than those individuals who do not possess these traits. Only individuals with fraud certifications are associated with more effective fraud risk assessments, while higher levels of informal fraud training are associated with less effective fraud risk assessments.

There is an interesting dynamic in this unexpected finding. Chui (2010) hypothesizes and provides evidence that novices primed to have a fraud mindset will assess fraud risk higher than novices primed to have an auditor mindset.³⁸ Chui (2010) also suggests that mindset can be a low cost alternative to experience, training, knowledge, and other personal traits for influencing performance. As a result, it is possible that a fraud mindset could be a correlated omitted variable and fraud detection proficiency indicator, which could be affecting the value of the coefficients of these models. It is also possible these results are a function of the dependent variable (FRADIFF) and the variety of answers provided by the benchmark panel. While the fraud risk assessments of the participants between the fraud and no fraud scenarios are not significantly different than each other, on average, the no fraud scenario has a mean of 6.27 (s.d. of 1.93) and the fraud scenario has a slightly higher mean of 6.83 (s.d. of 2.10). Further, the participants' fraud risk assessments are higher than the initial fraud risk assessment stated in the scenario background (i.e., moderate [5]), which is within expectations. However, while the benchmark panel fraud risk assessments for the fraud and no fraud scenario are not statistically different than each other, the means are not in line with expectations (no fraud: mean=7.33, range=7-8; fraud: mean=6.75, range=5-8), which could have had an adverse effect on overall regression results.

³⁸ Fraud mindset is a set of attitudes or knowledge structures held by forensic professionals which entail determining whether a fraud has taken place through evaluation of documentation and interviews. An auditor mindset involves to assess whether the accounting records and documentation are fairly stated within GAAP (Chui 2010).

Attempts to address limitations in the panel and possible ways to address concerns in future versions of this paper and in other studies are discussed below in section 5.5.

5.1.2 Audit Program Modifications

This study is also interested in the impact indicators of fraud detection proficiency have on an individual's audit plan modifications. Hammersley's (2011) fraud judgment and decision making (FJDM) model expects an auditor with experience, problem solving ability, epistemic motivation, and specific (rather than generic) fraud risk cues will appropriately modify the nature of audit procedures to address the specific fraud scheme(s) identifiable through those cues.

However, literature prior to this study indicates otherwise (e.g., Hammersley et al. 2011; Asare and Wright 2004; Hoffman and Zimbelman 2009; Boritz et al. 2015). One open question is whether this performance is due to a lack of the auditor characteristics from the FJDM model (Hammersley 2011) (see Chapter 1 Figure 1.1). This study tests whether individuals with higher levels of fraud-related experience, fraud certifications, formal fraud training, and informal fraud training are associated with more effective audit plan modifications. These predictions are primarily drawn from literature and expectations that additional domain-specific experience (e.g., Wright 2001; Hammersley 2006; Boritz et al. 2015), certifications (e.g., ACFE 7/23/2013 website), formal fraud training (e.g., Chen et al. 2008), and informal fraud training (e.g., Rose et al. 2012) increase performance and lead to more effective audit plan modifications.

Fraud-related experience is the only fraud detection proficiency variable with evidence of increasing audit program effectiveness, as predicted. Evaluation of the remaining coefficients of the fraud detection proficiency indicators reveal mixed results with indicators, which are statistically significant in the opposite direction of what was hypothesized or not significantly different than zero. Possessing a fraud certification is associated with fewer audit plan

modification matches in both scenarios, while higher levels of formal and informal fraud training are not statistically significant. The key results here indicate that while possessing a fraud certification allows an individual to effectively assess fraud risk, it does not by itself give them the ability to effectively modify audit plans, instead it is fraud-related task-specific experience which is shown to be important in determining audit plan modification effectiveness.

While hypotheses indicate fraud detection proficiency variables should improve audit plan modifications, it is an open question as to whether forensic professionals are less effective due to a tendency to over-audit due to their backgrounds. The results appear to suggest that forensic professionals (particularly those with certifications) are less effective but this test does not provide enough information to determine the direction of the ineffectiveness. The question of over-auditing is explored in section 5.3.

Similar to the fraud risk assessment analysis, it is possible the results are being masked due to a correlated omitted variable, fraud mindset. Chui (2010) finds individuals primed with a fraud mindset are more likely to assess fraud risk higher and less likely to focus on case facts relating to materiality than those with an audit mindset. In line with Hammersley's (2011) FJDM model, Chui (2010) theorizes an extension where individuals with fraud mindsets have higher fraud risk assessments, even in lower fraud risk situations, which will result additional audit procedures, higher audit budgets, or inefficient audits. This is due to the different focus required of the professions. Auditors are responsible for verifying documentation exists for transactions that are recorded in accordance with GAAP, whereas forensic individuals focus on authenticating documentation to prove transactions actually took place regardless of materiality level in order to establish whether a fraud occurred (Chui 2010).

5.2 How are Relationships between Fraud Detection Proficiency Indicators and the Ability to Assess Fraud Risk and Modify Audit Plans Impacted by an Auditor's Professional Skepticism?

Professional skepticism is mandatory during audit completion (PCAOB 2014d, AU230). However, open questions remain as to whether there is an ideal level of professional skepticism or if professional skepticism can be “too high” (Nelson 2009; Hurtt et al. 2013). This study examines the impact professional skepticism has on the fraud risk assessment and audit planning literature in two ways. First, is to explore the effect an individual's level of trait professional skepticism has on fraud risk assessments and audit plan modifications. Second, is to explore the relationship between professional skepticism and the fraud detection proficiency indicators.

The original FRADIFF models hypothesize higher levels of professional skepticism are associated with more effective fraud risk assessments (see Chapter 4 Table 4.6). On the other hand, the original APGSCORE models hypothesize that higher levels of professional skepticism should be sufficient to recognize higher fraud risks and the need to increase audit effort (i.e., extent) (see Chapter 4 Table 4.8). The idea is supported in the literature (Hammersley et al. 2011; Zimbelman 1997; Favere-Marchesi 2013) but nothing written within the definition or measurement of trait professional skepticism indicates these individuals should be more effective at modifying the nature of audit procedures (Hurtt 2010). Results are mixed as the fraud scenario fails to register a coefficient greater than zero, which is in line with expectations. Meanwhile, the no fraud scenario indicates an increase in professional skepticism is associated with an increase in the predicted number of modifications that match the panel. The former fails to disprove the hypothesis but also does not eliminate the possibility increasing sample size would improve effect size and the ability to discern a meaningful impact. The latter, at least preliminarily,

provides evidence that individuals with higher levels of professional skepticism produce more effective audit plan modifications. However, as discussed in sub-section 5.1.2, this model does not provide enough information to evaluate whether professional skepticism can be “too high” and lead to over-auditing (Nelson 2009; Hurtt et al. 2013) however, this will be further explored in the following section 5.3.

The remainder of this section addresses the study’s second research question, *how are relationships between fraud detection proficiency indicators and the ability to assess fraud risk and modify audit plans impacted by professional skepticism?* This exploratory question is motivated by the fact the generally accepted models of professional skepticism incorporate the possibility that professional skepticism interacts with evidence, experiences, education, training, and certifications and the difficulty in hypothesizing the potential interactions based on the research exploring the interactive impact of the particular variables of interest (Hurtt et al. 2013; Nelson 2009).

The overall results of the original fraud risk assessment models (see Chapter 4 Table 4.6) indicate that having a fraud certification and higher levels of professional skepticism have the expected impact on fraud risk assessment judgments. However, informal fraud training hinders individual fraud risk assessment effectiveness. When interaction effects are included, some additional benefits can be seen (see Chapter 4 Table 4.8). For example, when *FrCert* and *HPSS* are interacted, results indicate that having a higher level of professional skepticism and a fraud certification enhances the effectiveness of an individual’s fraud risk assessment. In addition, in the FRADIFF model higher levels of informal fraud training hinder or higher levels of professional skepticism improve risk assessment effectiveness as before, along with a moderately significant interaction effect. However, if you graph the simple slopes you can see how strong

the main effects are making the interactive effect imperceptible to the naked eye. Finally, formal fraud training is also found to have a main effect which hinders risk assessment effectiveness, which was not evident in the non-interaction model.

Results are fairly similar between the original and interaction models (see Chapter 4 Table 4.7 and Table 4.9). Fraud-related experience is statistically significant as are industry and audit experience. The remainder of the fraud detection proficiency variables are not statistically different than zero including certifications, formal and informal fraud training, and professional skepticism. However, the interaction models are able to tease out additional insights that add to and impact the interpretation of the results (see Chapter 4 Table 4.9). For example, in the original fraud model, fraud certifications is statistically significant but reduces the number of matches a participant produces but in the interactions model, the main effect was not significant and the test for including the fraud certifications*professional skepticism interaction did not warrant inclusion. In addition, formal fraud training is not significant but the interaction model has an interactive effect indicating a major interaction. As can be seen in Figure 5.1, the interaction has an interesting effect. At the mean level of professional skepticism, the amount of CPE has little impact on the effectiveness of the individual's audit program modifications. However, at one standard deviation above and one standard deviation below the mean of professional skepticism, changes in CPE have polar opposite effects. Higher levels of professional skepticism appear to compensate for lower levels of CPE and vice versa.

5.3 What is the Relationship between Fraud Detection Proficiency and Over-Auditing?

The final research question addresses an issue that tends to be on the forefront of many stakeholders' minds – audit costs and over-auditing (e.g., Palmrose 2009; O'Keefe et al. 1994; Ettredge et al. 2008). Within the context of this study, the concern is two-fold, the higher hourly

rate of forensic specialists and the fear that their focus and skillset will lead them to use more effort than necessary to address the risks at hand. Motivated by findings from Boritz et al. (2015) and Rose et al. (2012) who find that forensic professionals and auditors with fraud exposure, respectively, may be prone to over-auditing in certain situations but that other fraud detection proficiency indicators had yet to be examined, led to answering the following research question: *what is the relationship between fraud detection proficiency indicators and over-auditing?*

Results indicate the no fraud scenario is the lesser target for over-auditing as judged by the benchmark panel and are in fact more likely to under-audit. The OUMSCORE (fraud) model (see Chapter Table 4.10) indicates possessing a fraud certification and moving up in rank are associated with an increase in the predicted value of over-auditing. This in conjunction with the fraud risk assessment findings, indicate that while individuals with fraud certifications are well equipped at identifying and assessing fraud risk, their skillset is not adequately prepared for modifying audit plans within an external audit setting, possibly because issues such as budgets and materiality have a larger impact in decision making than they do in a fraud investigation setting.

5.4 Contributions

This study contributes to the academic literature by providing evidence with regard to a subset of the fraud judgment and decision making model proposed by Hammersley (2011) in a number of ways. First, results indicate that professional skepticism is an integral variable in improving fraud risk assessment effectiveness both as a main effect and particularly as an interaction variable. While professional skepticism did not prove to be an effective indicator of audit program effectiveness when evaluated on its own, it once again proved its evaluative power when treated as an interaction. This provides two contributions to the literature. It validates prior

professional skepticism theoretical models, which hypothesize skepticism's ability to interact with education, training, and experience variables (Hurtt et al. 2013; Nelson 2009) and suggests that future researchers either maintain the score in its original continuous form or split the variable into more categories rather than a simple dichotomous variable based on median split. It also validates its inclusion in Hammersley's (2011) model.

In addition, the limited impacts by the fraud detection proficiency variables provide further insights to the model. For instance, individuals with fraud certifications appear to be effective at assessing fraud risk. However, when it comes to audit plan modifications, they are not effective, which leads to over-auditing. This appears to suggest that while there is some correlation between fraud certifications and fraud-related task-specific experience, they are indeed capturing two separate constructs and that it is the fraud-related task-specific experience, which is key in determining audit plan modification effectiveness. Finally, results are mixed with regard to formal and informal fraud training providing limited to no evidence in these models indicating a need for additional research to determine if it is a function of recency effects or some other cause such as an omitted correlated variable such as fraud mindset.

Third, the study contributes by evaluating Hammersley's (2011) model using individuals with extensive professional experience. Both auditors and forensic professionals were included in the sample and more than 70% of them had a rank of manager or above. Similarly, approximately 69% had been an auditor for more than six (6) years and 80% (or 8 out of 10) of those individuals who identified as a forensic professional, had been working in the forensic profession for more than six (6) years. This adds to the literature, which frequently relies upon lower level professionals (e.g., Hammersley et al. 2011).

Fourth, the study contributes to Hammersley's (2011) study by evaluating both higher and lower risk fraud risk scenarios. Results indicate lower fraud risk situations should not be neglected and warrant additional research as individuals in the no fraud scenario are prone to assessing fraud risk less effectively and under-auditing in lower risk situations that still need some additional work performed due to changes in available client fraud risk information.

One of the other motivations for this study is to find some balance in the tension between the public's desire for auditors to discover financial statement fraud and the need for auditors to fulfill their gatekeeper obligation while maintaining a business subject to economic budget pressures driven in part by the corporations they review. This study contributes to the fraud risk assessment and audit plan modification literature while also keeping this goal in mind. First, the study examines higher and lower fraud risk scenarios to address concerns of over-auditing as advocated by Palmrose (2009), O'Keefe et al. (1994), and Ettredge et al. (2008). Results indicate that in this sample, the only fraud-related variable associated with over-auditing is possession of a fraud certification as is the increasing rank (i.e., promotion) of an individual within the firm. However, this study also finds that on average, individuals in the no fraud scenario are more likely to under-audit, indicating that over-auditing is not the only issue that researchers and regulators should be concerned about.

This study also examines characteristics commonly, but not necessarily, held by forensic professionals to understand what fraud domain specific variables may be effective in assessing fraud risk and modifying audit plans. This allows any qualified individual regardless of department or billable hour rate to be allocated to an audit engagement if their skillsets warrant. One of those variables is a new measure for direct fraud-related experience, which captures more details regarding applicable task-specific experiences than a generic year experience proxy used

in many studies (e.g., Rose 2007; Hammersley et al. 2011). The measure has Cronbach's alpha of 0.771, which is above the acceptable rate of 0.7, indicating the measures are capturing the same latent construct (Nunnally 1978), which also appears to have face validity. One limitation to the measure is the use of the Likert-scale, which is more prone to measurement error than using a continuous variable such as billable hours.

5.5 Limitations and Future Research

The largest limiting factor in this study is the number of participants who completed the survey. Further, there were far more audit professionals than forensic professionals. This caused there to be an inadequate distribution across the cross tabulation of variables, particularly among direct fraud experience, formal fraud education, formal fraud training, informal fraud training, and fraud certifications. With only 43 (FRADIFF) and 42 (APGSCORE, OUMSCORE) usable cases this study has limited power and did not allow for testing the audit plan modifications with ordinal logistic regression as originally planned.³⁹ To more effectively evaluate the research questions in this study, there should be approximately 300 additional participants.⁴⁰

The scenario used in this study is a modified version that has been used in prior research (Hammersley et al. 2011; Asare and Wright 2004) and is based on a real company and its fraudulent and restated financial statements. This was done to increase external validity but its fraud focused on overstating revenues through channel stuffing and a bill-and-hold scheme. As this scenario is a revenue-based fraud, which Auditing Standard No. 12, *Identifying and Assessing Risks of Material Misstatement* automatically classifies as "significant" fraud risk (PCAOB 2010, para. 71b). This could have resulted in demand effects if individuals translated

³⁹ Power analyses were run for each of the final OLS models and ranged between 0.818 and 0.942 (Soper 2013).

⁴⁰ The sample size was derived using a power analysis containing 27 predictors, an estimated medium effect size of 0.15, and an alpha of 0.05 (Soper 2013; Cohen 1988; Cohen et al. 2003; Abramowitz and Stegun 1965).

“significant” to automatically mean “high” fraud risk, thus limiting the amount of variability. A potential solution would have the two scenarios involve a typically lower fraud risk area, such as fixed assets. Future research can consider this possibility.

Forensic professionals provide services in large variety of areas, including investigations, disputes and litigation support, fraud risk management, regulatory compliance, and audit advisory services. It is possible that forensic professionals who do not work on as many audit advisory type engagements did not complete or finish the study as they did not feel they were qualified to “take the lead on an audit engagement” and answer the audit program modification questions. As a result, findings could be impacted in either direction. If individuals did not complete the study because they did not feel qualified to complete the study and to the extent that is true, the results may be overstated if fraud related education, training, and experiences typically provided in a forensic related career are not good indicators of effective fraud risk assessment and audit plan modifications. However, the opposite could also be true, individuals may have found they did have the knowledge and skills necessary to complete the scenario effectively. In the future, the instructions could be modified to put individuals in an advisory role and to make the audit program guide more explicit as to the standard audit procedure being proscribed rather than as generic as it was.

The benchmark panel is an additional set of limitations. The benchmark panel was made up of a set of individuals with varying backgrounds and experiences. This study used a sample of four panelists. There was a wide range of standard deviations within the panelist answers. This is likely due to the fact that audit planning is an area that requires high levels of judgment resulting in reasonable people arriving at the same conclusion (an audit program designed to provide sufficient, competent evidence to provide an opinion) with varying methods. It is possible that a

larger or different sample of experts with different (or more similar) backgrounds and experiences would come to a different set of conclusions with regard to the fraud risk assessments and audit plan modifications for the two scenarios at hand. This could have an impact on the overall results of the study both in magnitude and possibly direction. Other studies with panelists range from three experts (e.g., Hoffman and Zimbelman 2009) to ten experts for each set of tasks (e.g., Boritz et al. 2015).

In addition, this study's panelists also completed both the fraud and no fraud scenarios in order to establish the study's benchmarks. It is possible that there was some carryover effect in their answers due to the short period of time in which they completed both cases. The initial design called for a consensus meeting to mitigate this issue but those results were ultimately abandoned due to an aggressive panelist. As a result, a solicitation for additional panelists were sent and the average scores of the final set of panelists were used. However, this method may not have fully eliminated the concerns about limited time between the completions of the two cases. Future research should include obtaining a new set of five to six (5-6) panelists who meet to discuss the cases and complete the benchmark process in a manner that promotes individual freedom to express their predetermined opinions but to provide reasons and adjust their answers in light of discussion and reevaluations of those opinions.

It is possible that fraud mindset is a correlated omitted variable. Fraud mindset is a cognitive function that operates as forensic professionals need to complete tasks within their daily jobs. As explained in sub-section 5.1.1, it could be a low cost alternative to other fraud detection proficiency variables such as experience, training, and education. However, it is also likely highly entwined with each of the fraud detection proficiency variables as well. Due to the cognitive nature of mindset, research typically uses mindset as an experimental manipulation. To

understand this eliminate this as a potential cause, future research should consider running a fraud mindset experiment with the fraud detection proficiency indicators as covariates. In addition, future research could examine the extent to which fraud mindset is stable versus flexible. Chui (2010) uses novices to hold experience, training, and education constant, finding college senior audit students are able to acquire the mindset of an auditor or forensic specialist. This is primarily supported as evidenced by higher fraud risk assessments by those primed with the fraud mindset. Generalizing these results to more experienced individuals (e.g., senior associates), research should examine the effects of an experienced auditor (forensic professional) being primed with a fraud (audit) mindset.

The study finds no, limited, and sometimes mixed results with regard to some of the fraud detection proficiency variable (e.g., *CPE* and *InfTrain*) hypotheses. This could be due to the fact education and training variables have happened too far in the past to register an effect or to the level of effort expended in learning and applying the material. For example, individuals who participated in a fraud training one (1) month ago may have their responses more impacted by that training session than an individual who participated in the same training 11 months ago.

The over-auditing models have two limitations of note. First, the dependent variable and subsequent analysis does not take into consideration the magnitude of the over- or under-auditing. If the procedure score is less than the benchmark panel recommendation, the participant is deemed to have under-audited regardless of whether their score was one (1) point under or three (3) points under the panel's recommendation. The same applies for over-auditing. Second, the overall score has a "netting" effect, which assumes a one-for-one equal trade where if someone over-audits on one procedure and under-audits on another procedure, the score treats it

like the participant was effective (i.e., no under- or over-auditing), which is not likely and could be underestimating the effects of over-auditing.

As a result of the smaller sample size and number of responses in certain categories for Educ, FraudExp, CPE, InfTrain, FirmType, Rank, and AuditExp were collapsed and were treated as continuous variables in ways not originally designed by the study's instrument. This affects the final model's coefficients and interpretation of the results since variables are treated as if they are measured with scores implying equal distance between units, when that may not be the case.

Finally, evaluating the differences between the fraud and no fraud scenario at the individual variable is beyond the scope of the current study due to the limited sample size. As a result some findings regarding the fraud detection proficiency variables and professional skepticism may be masked through the use of the *FrInd* variable. For example, determining potential causes as to why individuals in a lower risk revenue scenario, which still had additional risks that needed to be addressed (just not to the level of the seeded fraud scenario) has not been evaluated but indicates that additional research into this phenomenon is warranted.

5.6 Summary

This chapter set out to answer the three research questions addressed in this study: *How do indicators of fraud detection proficiency impact an individual's ability to adequately assess fraud risk and modify audit plans? How are these relationships impacted by an auditor's professional skepticism? And finally, is there a relationship between fraud detection proficiency and over-auditing?* There are still some questions unanswered and additional questions that were raised from the results of this study. However, there are four main takeaways from answering the research questions at hand.

First, fraud certifications are effective in fraud risk assessments, are not effective in audit plan modifications, and on average those individuals tend to over audit. Second, it is fraud-related task-specific experience that has the desired impact on audit plan modification effectiveness. Third, including professional skepticism as an interaction is more reflective of the variable's nature, with results supporting interactions with fraud certifications and informal fraud training in the FRADIFF model and formal fraud training in the APGSCORE model. Finally, individuals of higher Rank, in addition to those with fraud certifications being more likely to over-audit, while individuals in the no fraud scenario are more likely to under-audit.

REFERENCES

- Abdolmohammadi, M. J. 1999. A Comprehensive Taxonomy of Audit Task Structure, Professional Rank and Decision Aids for Behavioral Research. *Behavioral Research in Accounting* 11:51.
- Abramowitz, M., and I. A. Stegun, eds. 1965. *Handbook of mathematical functions: With formulas, graphs, and mathematical tables*. New York: Dover Publications.
- Agoglia, C. P., C. Beaudoin, and G. T. Tsakumis. 2009. The Effect of Documentation Structure and Task-Specific Experience on Auditors' Ability to Identify Control Weaknesses. *Behavioral Research in Accounting* 21 (1):1-17.
- Amemiya, T. 1973. Regression Analysis when the Dependent Variable Is Truncated Normal. *Econometrica* 41 (6):997-1016.
- American Institute of Certified Public Accountants. *About*, 7/25/2013 [cited 7/25/2013]. Available from <http://www.aicpa.org/About/Pages/About.aspx>.
- . *Certified in Financial Forensics (CFF) Credential*, 7/23/2013 [cited 7/23/2013]. Available from <http://www.aicpa.org/InterestAreas/ForensicAndValuation/Membership/Pages/certified-in-financial-forensics.aspx>.
- . *Licensure*, 7/25/2013 [cited 7/25/2013]. Available from <http://www.aicpa.org/BecomeACPA/Licensure/Pages/default.aspx>.
- . 1988. *Auditing Accounting Estimates*. Statement on Auditing Standards No. 57. New York, NY: AICPA.
- . 1997. *Due Care in the Performance of Work*. Statement on Auditing Standards No. 1. New York, NY: AICPA.
- . 2002. *Consideration of Fraud in a Financial Statement Audit*. Statement on Auditing Standards No. 99. New York, NY: AICPA.
- . 2011. Content and skill specifications for the uniform CPA examination. Ewing, NJ: AICPA.
- Apostolou, B., J. M. Hassell, and S. A. Webber. 2001. Fraud Risk factors: Ratings By Forensic Experts. *CPA Journal* 71 (10):48.
- Asare, S. K., and A. M. Wright. 2004. The Effectiveness of Alternative Risk Assessment and Program Planning Tools in a Fraud Setting. *Contemporary Accounting Research* 21 (2):325-352.
- Association of Certified Fraud Examiners (ACFE). *Anti-fraud education partnership* [cited 7/27/2013]. Available from <http://www.acfe.com/higher-ed.aspx>.
- . *How to become a CFE* [cited 07/23/2013]. Available from <http://www.acfe.com/become-cfe-qualifications.aspx>.
- . 2012. Report to the nations on occupational fraud and abuse: 2012 global fraud study. Austin, TX: ACFE.
- Beecham, S., T. Hall, C. Britton, M. Cottee, and A. Rainer. 2005. Using an expert panel to validate a requirements process improvement model. *Journal of Systems and Software* 76 (3):251-275.
- Bell, T. B., and J. V. Carcello. 2000. A Decision Aid for Assessing the Likelihood of Fraudulent Financial Reporting. *Auditing: A Journal of Practice & Theory* 19 (1):169-184.

- Blay, A. D., L. D. Sneathen, and T. Kizirian. 2007. The effects of fraud and going-concern risk on auditors' assessments of the risk of material misstatement and resulting audit procedures. *International Journal of Auditing* 11 (3):149-163.
- Bonner, S. E. 1990. Experience Effects in Auditing: The Role of Task-Specific Knowledge. *The Accounting Review* 65 (1):72.
- Bonner, S. E. 2008. *Judgment and decision making in accounting*. Upper Sadle River, NJ: Pearson Prentice Hall.
- Boritz, J. E., N. Kochetova-Kozloski, and L. A. Robinson. 2015. Are Fraud Specialists Relatively More Effective than Auditors at Modifying Audit Programs in the Presence of Fraud Risk? *The Accounting Review* 90 (3):881-915.
- Brickner, D. R., L. S. Mahoney, and S. J. Moore. 2010. Providing an Applied-Learning Exercise in Teaching Fraud Detection: A Case of Academic Partnering with IRS Criminal Investigation. *Issues in Accounting Education* 25 (4):695-708.
- Cacioppo, J. T., and R. E. Petty. 1982. The need for cognition. *Journal of personality and social psychology* 42 (1):116-131.
- Canadian Institute of Chartered Accountants (CICA). 2012. The UFE Candidates' Competency Map: Understanding the Professional Competencies Evaluated on the UFE. Toronto, Ontario: The Canadian Institute of Chartered Accountants, 1-109.
- 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.
- Carpenter, T. D., C. Durtschi, and L. M. Gaynor. 2011. The Incremental Benefits of a Forensic Accounting Course on Skepticism and Fraud-Related Judgments. *Issues in Accounting Education* 26 (1):1-21.
- Carpenter, T. D., and J. L. Reimers. 2013. Professional Skepticism: The Effects of a Partner's Influence and the Level of Fraud Indicators on Auditors' Fraud Judgments and Actions. *Behavioral Research in Accounting* 25 (2):45-69.
- Causholli, M., and W. R. Knechel. 2012. An examination of the credence attributes of an audit. *Accounting Horizons* 26 (4):631-656.
- Chen, Y.-S., B.-G. Chang, and C.-C. Lee. 2008. The association between continuing professional education and financial performance of public accounting firms. *The international journal of human resource management* 19 (9):1720-1737.
- Choo, F., and K. Tan. 2000. Instruction, Skepticism, and Accounting Students' Ability to Detect Frauds in Auditing. *The Journal of Business Education* 1 (Fall):72-87.
- Choo, F., and K. T. Trotman. 1991. The relationship between knowledge structure and judgments for experienced and inexperienced auditors. *Accounting Review*:464-485.
- Chui, L. 2010. An experimental examination of the effects of fraud specialist and audit mindsets on fraud risk assessments and on the development of fraud-related problem representations, Accounting, University of North Texas, Denton, TX.
- Coate, C. J., R. E. Florence, and K. L. Kral. 2002. Financial Statement Audits, a Game of Chicken? *Journal of Business Ethics* 41 (1/2):1-11.
- Cohen, A. R., E. Stotland, and D. M. Wolfe. 1955. An experimental investigation of need for cognition. *The Journal of Abnormal and Social Psychology* 51 (2):291-294.
- Cohen, J. 1988. *Statistical power analysis for the behavioral sciences*: Routledge.
- Cohen, J., P. Cohen, S. G. West, and L. S. Aiken. 2003. *Applied multiple regression/correlation analysis for the behavioral sciences*. 3rd ed. Mahwah, NJ: Lawrence Erlbaum Associates.

- Cohen, M. M., M. A. Crain, and A. Sanders. 1996. Skills Used in Litigation Services. *Journal of Accountancy* 182 (3):101-103.
- Corless, J. C. 2009. Fraud Awareness of Internal Auditors. *Journal of Theoretical Accounting Research* 4 (2):93-109.
- Curtis, G. E. 2008a. Legal and Regulatory Environments and Ethics: Essential Components of a Fraud and Forensic Accounting Curriculum. *Issues in Accounting Education* 23 (4):535-543.
- . 2008b. The Model Curriculum in Fraud and Forensic Accounting and Economic Crime Programs at Utica College. *Issues in Accounting Education* 23 (4):581-592.
- Davis, J. S., and I. Solomon. 1989. Experience, expertise, and expert-performance research in public accounting. *Journal of Accounting Literature* 8 (1):150-164.
- Deshmukh, A., K. E. Karim, and P. H. Siegel. 1998. An Analysis of Efficiency and Effectiveness of Auditing to Detect Management Fraud: A Signal Detection Theory Approach. *International Journal of Auditing* 2 (2):127-138.
- Dibben, M. R., and J. Rose. 2010. Checking, not trusting: trust, distrust and cultural experience in the auditing profession. In *Organizational Trust: A Cultural Perspective*, edited by M. N. K. Saunders, D. Skinner, G. Dietz, N. Gillespie and R. J. Lewicki. New York: Cambridge University Press, 156-181.
- Eilifsen, A., W. R. Knechel, and P. Wallage. 2001. Application of the Business Risk Audit Model: A Field Study. *Accounting Horizons* 15 (3):193-207.
- Eining, M. M., 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.
- Emam, K. E., and H.-W. Jung. 2001. An empirical evaluation of the ISO/IEC 15504 assessment model. *Journal of Systems and Software* 59 (1):23-41.
- Ettredge, M. L., J. C. Bedard, and K. M. Johnstone. 2008. Empirical Tests of Audit Budget Dynamics. *Behavioral Research in Accounting* 20 (2):1-18.
- Favere-Marchesi, M. 2013. Effects of Decomposition and Categorization on Fraud-Risk Assessments. *Auditing: A Journal of Practice & Theory* 32 (4):201-219.
- Field, A. 2013. *Discovering statistics using IBM SPSS statistics*. Thousand Oaks, CA: Sage Publications.
- Fleming, A. S., T. A. Pearson, and R. A. Riley Jr. 2008. West Virginia University: Forensic accounting and fraud investigation (FAFI). *Issues in Accounting Education* 23 (4):573-580.
- Glover, S. M., D. F. Prawitt, J. J. Schultz, and M. F. Zimbelman. 2003. A Test of Changes in Auditors' Fraud-Related Planning Judgments since the Issuance of SAS No. 82. *Auditing: A Journal of Practice & Theory* 22 (2):237-251.
- Gobeil, J., and F. Phillips. 2001. Relating Case Presentation Style and Level of Student Knowledge to Fact Acquisition and Application in Accounting Case Analyses. *Issues in Accounting Education* 16 (2):205-222.
- Gold, A., W. R. Knechel, and P. Wallage. 2012. The Effect of the Strictness of Consultation Requirements on Fraud Consultation. *The Accounting Review* 87 (3):925-949.
- Graham, L., and J. C. Bedard. 2003. Fraud Risk and Audit Planning. *International Journal of Auditing* 7 (1):55-70.

- Hackenbrack, K. 1993. The Effect of Experience with Different Sized Clients on Auditor Evaluations of Fraudulent Financial Reporting Indicators. *Auditing* 12 (1):99-110.
- Hackenbrack, K., and W. R. Knechel. 1997. Resource Allocation Decisions in Audit Engagements. *Contemporary Accounting Research* 14 (3):481-499.
- Hammersley, J. S. 2006. Pattern Identification and Industry-Specialist Auditors. *The Accounting Review* 81 (2):309-336.
- . 2011. A Review and Model of Auditor Judgments in Fraud-Related Planning Tasks. *Auditing: A Journal of Practice & Theory* 30 (4):101-128.
- Hammersley, J. S., K. M. Johnstone, and K. Kadous. 2011. How Do Audit Seniors Respond to Heightened Fraud Risk? *Auditing: A Journal of Practice & Theory* 30 (3):81-101.
- Hassink, H., R. Meuwissen, and L. Bollen. 2010. Fraud detection, redress and reporting by auditors. *Managerial Auditing Journal* 25 (9):861-881.
- Herz, P. J., and J. J. Schultz, Jr. 1999. The Role of Procedural and Declarative Knowledge in Performing Accounting Tasks. *Behavioral Research in Accounting* 11:1-26.
- Hoffman, V. B., and M. F. Zimbelman. 2009. Do Strategic Reasoning and Brainstorming Help Auditors Change Their Standard Audit Procedures in Response to Fraud Risk? *The Accounting Review* 84 (3):811-837.
- Huber, W. D. 2013. Forensic Accountants, Forensic Accounting Certifications, and Due Diligence. *Journal of Forensic & Investigative Accounting* 5 (1):182-202.
- Hurt, K., M. Eining, and D. Plumlee. 2012. Linking professional skepticism to auditors' behaviors: Working paper Baylor University, and The University of Utah.
- Hurt, R. K. 2010. Development of a scale to measure professional skepticism. *Auditing: A Journal of Practice & Theory* 29 (1):149-171.
- Hurt, R. K., H. Brown-Liburd, C. E. Earley, and G. Krishnamoorthy. 2013. Research on Auditor Professional Skepticism: Literature Synthesis and Opportunities for Future Research. *Auditing: A Journal of Practice & Theory* 32 (Supplement 1):45-97.
- Johnstone, K. M., and J. C. Bedard. 2001. Engagement Planning, Bid Pricing, and Client Response in the Market for Initial Attest Engagements. *The Accounting Review* 76 (2):199-220.
- Knapp, C. A., and M. C. Knapp. 2001. The effects of experience and explicit fraud risk assessment in detecting fraud with analytical procedures. *Accounting, Organizations & Society* 26 (1):25-37.
- Kranacher, M. J., B. W. Morris, T. A. Pearson, and R. A. Riley. 2008. A Model Curriculum for Education in Fraud and Forensic Accounting. *Issues in Accounting Education* 23 (4):505-519.
- Kresse, W. J. 2008. The Saint Xavier University Graduate Program in Financial Fraud Examination and Management. *Issues in Accounting Education* 23 (4):601-608.
- Krishnan, J., J. Krishnan, and H. Song. 2011. The Effect of Auditing Standard No. 5 on Audit Fees. *Auditing: A Journal of Practice & Theory* 30 (4):1-27.
- Kruglanski, A. W. 1989. *Lay epistemics and human knowledge: cognitive and motivational bases*. New York: Plenum Press.
- Kruglanski, A. W. 1990. Lay epistemic theory in social-cognitive psychology. *Psychological Inquiry* 1 (3):181-197.

- Kruglanski, A. W., and S. Fishman. 2009. The need for cognitive closure. In *Handbook of Individual Differences in Social Behavior*, edited by M. R. Leary and R. H. Hoyle. New York, NY: The Guilford Press, 343-353.
- Landis, J. R., and G. G. Koch. 1977. The Measurement of Observer Agreement for Categorical Data. *Biometrics* 33 (1):159-174.
- Loebbecke, J. K., M. M. Eining, and J. J. Willingham. 1989. Auditors' Experience with Material Irregularities: Frequency, Nature, and Detectability. *Auditing* 9 (1):1-28.
- Long, J. S., and J. Freese. 2006. *Regression models for categorical dependent variables using Stata*: Stata press.
- Low, K.-Y. 2004. The effects of industry specialization on audit risk assessments and audit-planning decisions. *The Accounting Review* 79 (1):201-219.
- Lynch, A. L., U. S. Murthy, and T. J. Engle. 2009. Fraud Brainstorming Using Computer-Mediated Communication: The Effects of Brainstorming Technique and Facilitation. *The Accounting Review* 84 (4):1209-1232.
- McMillan, J. J., and R. A. White. 1993. Auditors' belief revisions and evidence search: The effect of hypothesis frame, confirmation bias, and professional skepticism. *The Accounting Review* 68 (3): 443-465.
- Mehrabian, A., and L. Bank. 1978. A Questionnaire Measure of Individual Differences in Achieving Tendency. *Educational and Psychological Measurement* 38 (2):475-478.
- Mock, T. J., J. Bédard, P. J. Coram, S. M. Davis, R. Espahbodi, and R. C. Warne. 2013. The Audit Reporting Model: Current Research Synthesis and Implications. *Auditing: A Journal of Practice & Theory* 32 (Supplement 1):323-351.
- Mock, T. J., and J. L. Turner. 2005. Auditor Identification of Fraud Risk Factors and their Impact on Audit Programs. *International Journal of Auditing* 9 (1):59-77.
- Mock, T. J., and A. Wright. 1993. An exploratory study of auditors' evidential planning judgments. *Auditing* 12:39-39.
- Monroe, G., and J. Ng. 2000. An examination of order effects in auditors' inherent risk assessments. *Accounting & Finance* 40 (2):153-167.
- Moroney, R., and P. Carey. 2011. Industry- versus Task-Based Experience and Auditor Performance. *Auditing: A Journal of Practice & Theory* 30 (2):1-18.
- Nagelkerke, N. J. 1991. A note on a general definition of the coefficient of determination. *Biometrika* 78 (3):691-692.
- Nelling, E., and E. Webb. 2009. Corporate social responsibility and financial performance: the "virtuous circle" revisited. *Review of Quantitative Finance and Accounting* 32 (2):197-209.
- Nelson, M. W. 2009. A Model and Literature Review of Professional Skepticism in Auditing. *Auditing: A Journal of Practice & Theory* 28 (2):1-34.
- Nunnally, J. 1978. *Psychometric Theory*. New York: McGraw Hill.
- O'Keefe, T. B., D. A. Simunic, and M. T. Stein. 1994. The Production of Audit Services: Evidence from a Major Public Accounting Firm. *Journal of Accounting Research* 32 (2):241-261.
- Owhoso, V. E., W. F. Messier Jr, and J. G. Lynch Jr. 2002. Error Detection by Industry-Specialized Teams during Sequential Audit Review. *Journal of Accounting Research* 40 (3):883-900.

- Palmrose, Z.-V. 2009. Science, politics, and accounting: A view from the Potomac. *The Accounting Review* 84 (2):281-297.
- Pearson, T. A., and T. W. Singleton. 2008. Fraud and Forensic Accounting in the Digital Environment. *Issues in Accounting Education* 23 (4):545-559.
- Petty, R. E., P. Brinol, C. Loersch, and M. J. McCaslin. 2009. The need for cognition. In *Handbook of Individual Differences in Social Behavior*, edited by M. R. Leary and R. H. Hoyle. New York, NY: The Guilford Press, 318-329.
- Phillips, F., and G. Vaidyanathan. 2004. Should Case Materials Precede or Follow Lectures? *Issues in Accounting Education* 19 (3):305-319.
- Pincus, K. V. 1989. The efficacy of a red flags questionnaire for assessing the possibility of fraud. *Accounting, Organizations and Society* 14 (1-2):153-163.
- Pope, K. R., and B. Ong. 2007. Strategies for Forming an Effective Forensic Accounting Team. *CPA Journal* 77 (4):64-66.
- Popova, V. 2013. Exploration of skepticism, client-specific experiences, and audit judgments. *Managerial Auditing Journal* 28 (2):140-160.
- Public Company Accounting Oversight Board. 2004. *Auditing Standard No. 2 An Audit of Internal Control Over Financial Reporting Performed in Conjunction With an Audit of Financial Statements*. AS No. 2.
http://pcaobus.org/standards/auditing/pages/auditing_standard_2.aspx.
- . 2006. *Auditing Standard No. 5 An Audit of Internal Control Over Financial Reporting That Is Integrated with An Audit of Financial Statements and Related Other Proposals*. AS No. 5. <http://pcaobus.org/Rules/Rulemaking/Pages/Docket021.aspx>.
- . 2007a. *Observations of Auditors' Implementation of PCAOB Standards Relating to Auditors' Responsibilities with Respect to Fraud*. Release No. 2007-01. Washington, D.C.: PCAOB.
- . 2007b. *Auditing Standard No. 5 An Audit of Internal Control Over Financial Reporting That Is Integrated with An Audit of Financial Statements*. AS No. 5.
http://pcaobus.org/Standards/Auditing/Pages/Auditing_Standard_5.aspx.
- . 2010. *Auditing Standard No. 12 Identifying and Assessing Risks of Material Misstatement*. AS No. 12.
http://pcaobus.org/Standards/Auditing/Pages/Auditing_Standard_12.aspx.
- . 2014a. *Auditing Accounting Estimates*. AU Section 342.
<http://pcaobus.org/Standards/Auditing/Pages/AU342.aspx>.
- . 2014b. *Consideration of Fraud in a Financial Statement Audit*. AU Section 316.
<http://pcaobus.org/Standards/Auditing/Pages/AU316.aspx>.
- . 2014c. *Training and Proficiency of the Independent Auditor*. AU Section 210.
<http://pcaobus.org/Standards/Auditing/Pages/AU210.aspx>.
- . 2014d. *Due Professional Care in the Performance of Work*. AU Section 230.
<http://pcaobus.org/Standards/Auditing/Pages/AU230.aspx>.
- Ramamoorti, S. 2008. The Psychology and Sociology of Fraud: Integrating the Behavioral Sciences Component Into Fraud and Forensic Accounting Curricula. *Issues in Accounting Education* 23 (4):521-533.
- Rezaee, Z., G. H. Lander, and A. Reinstein. 1996. Integrating forensic accounting into the accounting curriculum. *Accounting Education* 1 (2):147-162.

- Ricchiute, D. N. 1999. The effect of audit seniors' decisions on working paper documentation and on partners' decisions. *Accounting, Organizations and Society* 24 (2):155-171.
- Rose, J. M. 2007. Attention to Evidence of Aggressive Financial Reporting and Intentional Misstatement Judgments: Effects of Experience and Trust. *Behavioral Research in Accounting* 19 (1):215-229.
- Rose, J. M., B. A. McKay, C. S. Norman, and A. M. Rose. 2012. Designing Decision Aids to Promote the Development of Expertise. *Journal of Information Systems* 26 (1):7-34.
- SAS. 2015. *Usage Note 22599: Understanding and correcting complete or quasi-complete separation problems* 2006 [cited May 9, 2015]. Available from <http://support.sas.com/kb/22/599.html>.
- Seda, M., and B. K. Peterson Kramer. 2014. An Examination of the Availability and Composition of Forensic Accounting Education in the United States and Other Countries. *Journal of Forensic & Investigative Accounting* 6 (1):1-46.
- Shaub, M. K. 1996. Trust and suspicion: The effects of situational and dispositional factors on auditors' trust of clients. *Behavioral Research in Accounting* 8:154-174.
- Shaub, M. K., and J. E. Lawrence. 1996. Ethics, experience and professional skepticism: A situational analysis. *Behavioral Research in Accounting* 8 (Supplement):124-157.
- Sim, J., and C. C. Wright. 2005. The kappa statistic in reliability studies: Use, interpretation, and sample size requirements. *Physical therapy* 85 (3):257-268.
- Smith, G., and D. Crumbley. 2009. How divergent are pedagogical views toward the fraud/forensic accounting curriculum. *Global Perspectives on Accounting Education* 6:1-24.
- Solomon, I., M. D. Shields, and O. R. Whittington. 1999. What do industry-specialist auditors know? *Journal of Accounting Research* 37 (1):191-208.
- A-priori Sample Size Calculator for Multiple Regression Version 3.0 Beta (Software), Available from <http://www.danielsoper.com/statcalc>.
- Taylor, M. H. 2000. The Effects of Industry Specialization on Auditors' Inherent Risk Assessments and Confidence Judgements. *Contemporary Accounting Research* 17 (4):693-712.
- Thibodeau, J. C. 2003. The Development and Transferability of Task Knowledge. *Auditing: A Journal of Practice & Theory* 22 (1):47-67.
- Trompeter, G. M., T. D. Carpenter, N. Desai, K. L. Jones, and R. A. Riley. 2013. A Synthesis of Fraud-Related Research. *Auditing: A Journal of Practice & Theory* 32 (Supplement 1):287-321.
- Trotman, K. T., and W. F. Wright. 2012. Triangulation of audit evidence in fraud risk assessments. *Accounting, Organizations and Society* 37 (1):41-53.
- Waddock, S. A., and S. B. Graves. 1997. The corporate social performance-financial performance link. *Strategic Management Journal* 18 (4):303-319.
- Wilks, T. J., and M. F. Zimbelman. 2004. Decomposition of Fraud Risk Assessments and Auditors' Sensitivity to Fraud Cues. *Contemporary Accounting Research* 21 (3):719-745.
- Wright, W. F. 2001. Task experience as a predictor of superior loan loss judgments. *Auditing* 20 (1):147-155.
- Young, G. R. 2008. Forensic Accounting and FAU: An Executive Graduate Program. *Issues in Accounting Education* 23 (4):593-599.

Zimbelman, M. F. 1997. The effects of SAS No. 82 on auditors' attention to fraud risk factors and audit planning decisions. *Journal of Accounting Research* 35:75-97.

FIGURES

Figure 1.1 Fraud risk assessment and audit plan modifications FJDM model (modified from Hammersley (2011)) A Review and Model of Auditor Judgments in Fraud-Related Planning Tasks. Auditing: A Journal of Practice and Theory 30 (4): 101-128. Used with permission of Lisa Habblitz, American Accounting Association, 2015.

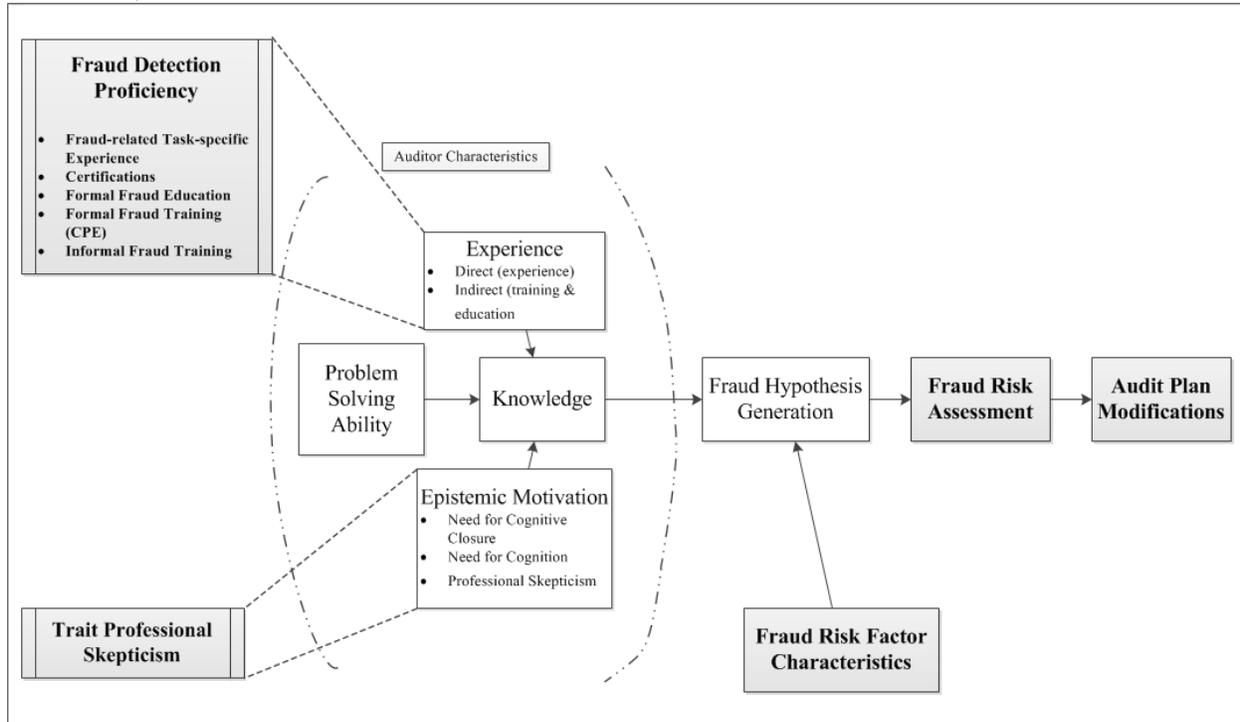
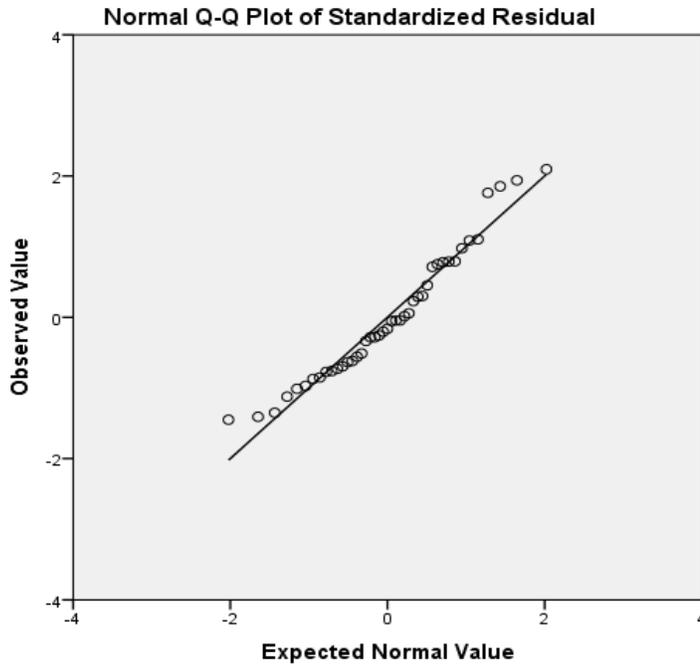
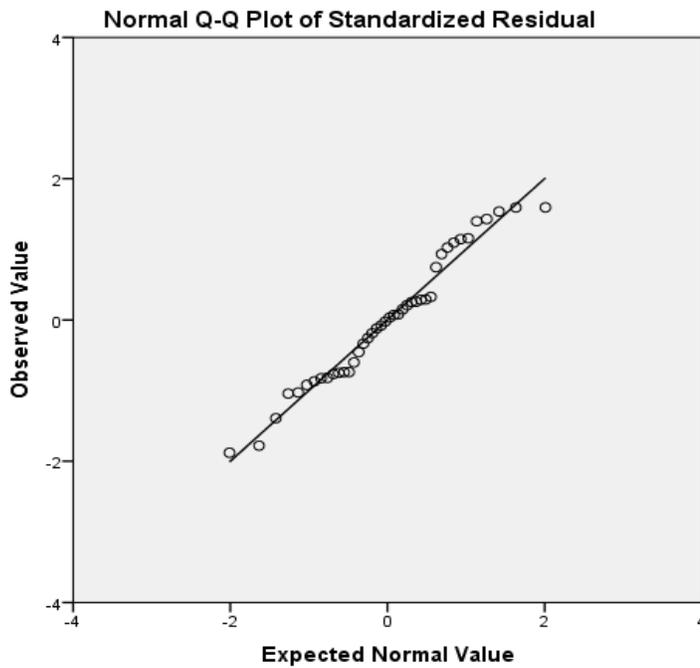


Figure 4.1. Normal Quantile-Quantile plots
Q-Q Plots - FRADIFF and APGSCORE

Panel A. Normal quantile-quantile plots for the FRADIFF model



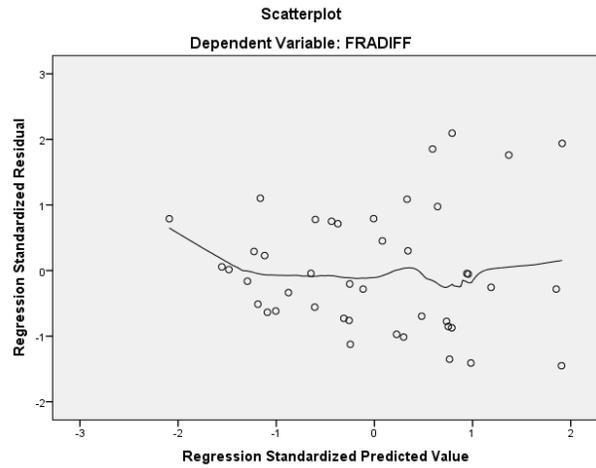
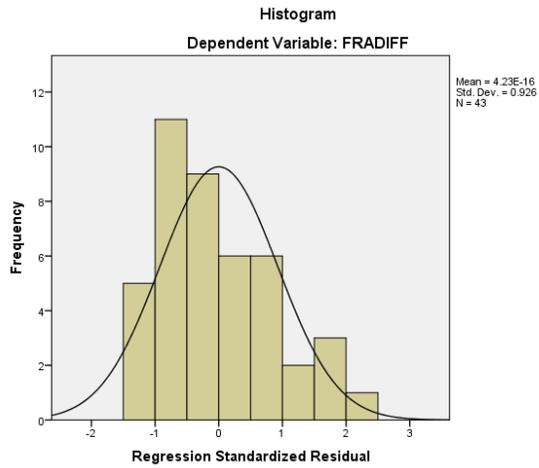
Panel B. Normal quantile-quantile plots for the APGSCORE model



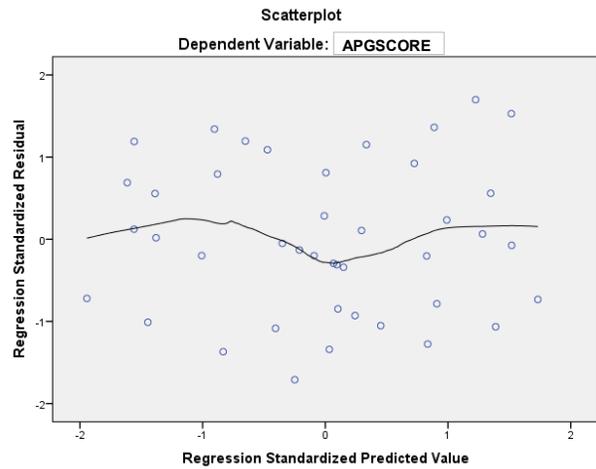
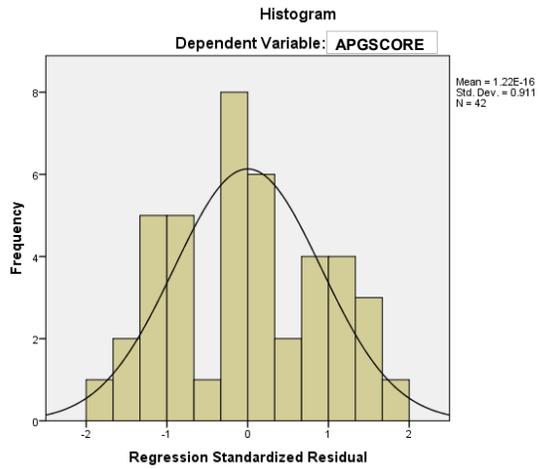
Note: FRADIFF sample n=43 and APGSCORE sample = 42

Figure 4.2. Linearity, normality, and homoscedasticity tests
Homoscedasticity Tests

Panel A. FRADIFF histogram and standardized residual scatterplot



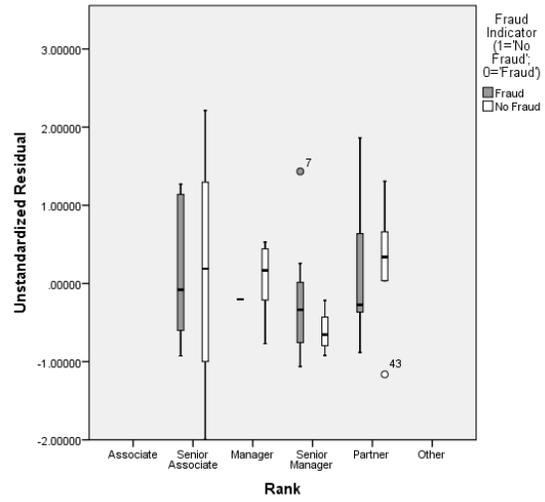
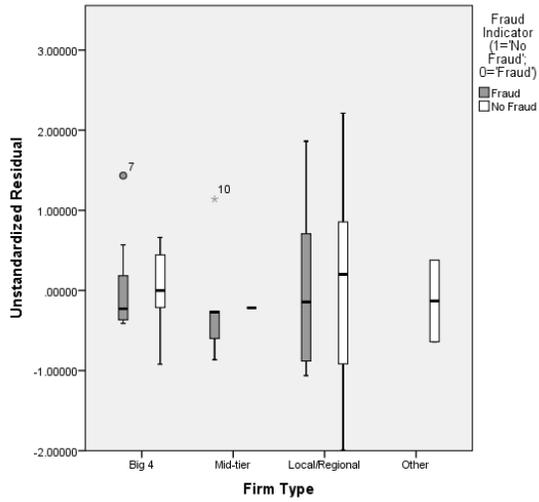
Panel B. APGSCORE histogram and standardized residual scatterplot



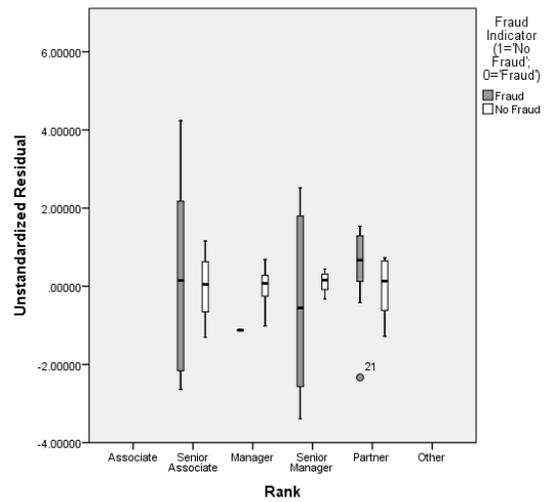
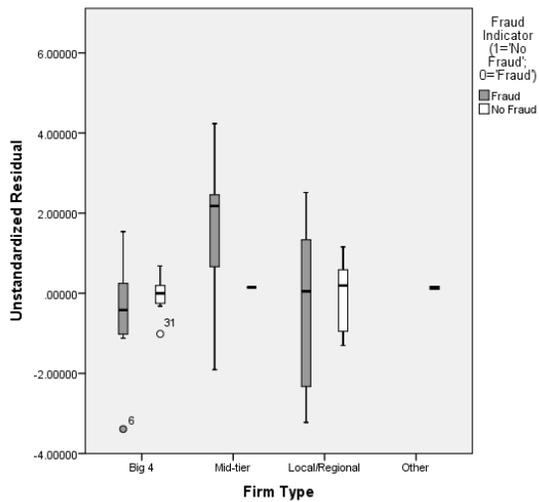
Note: FRADIFF sample n=43 and APGSCORE sample = 42

Figure 4.3. Independence of errors by FIRMTYPE and RANK
Independence of Errors by Firm Type and Rank Clusters

Panel A. FRADIFF unstandardized residuals



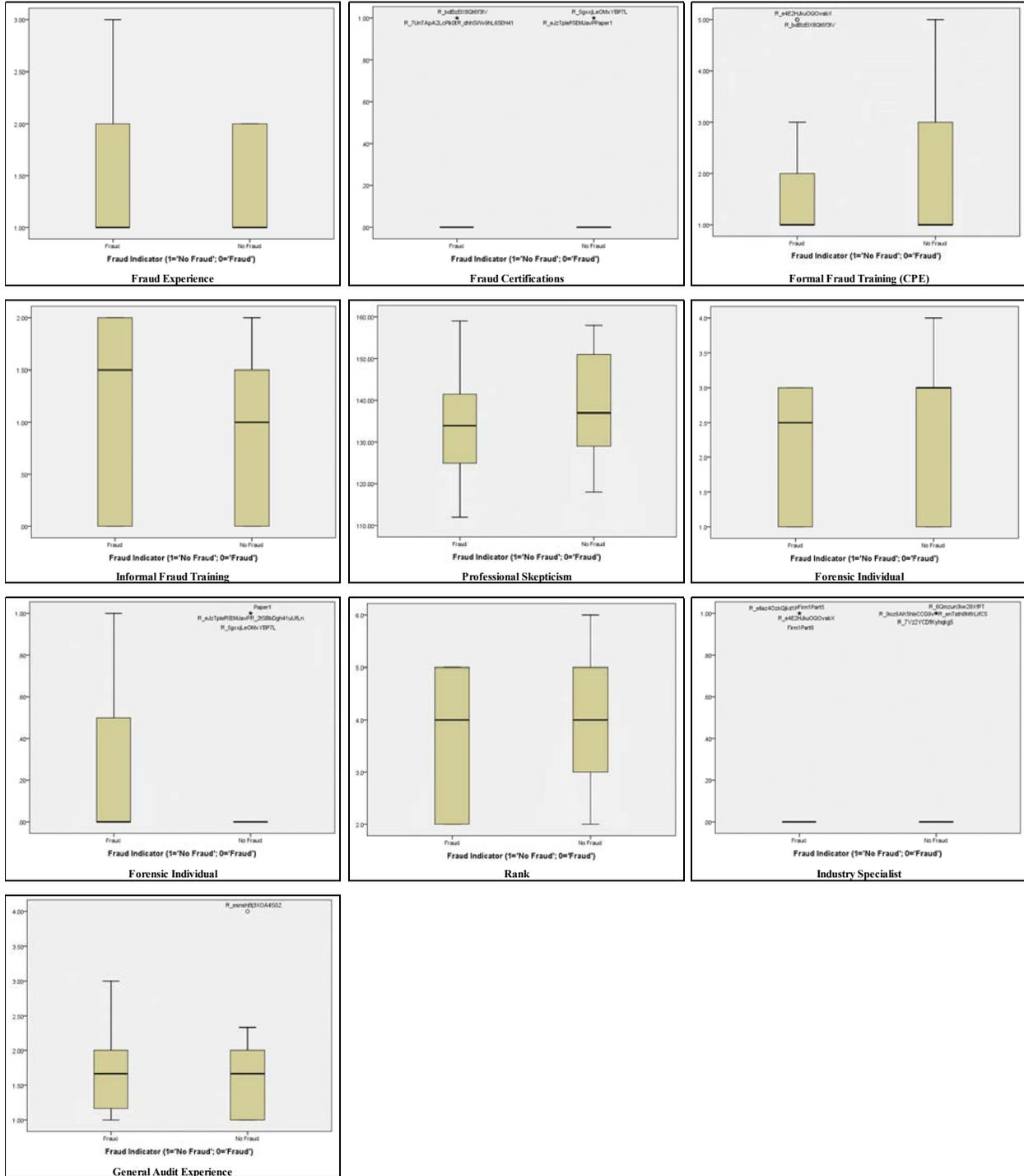
Panel B. APGSCORE unstandardized residuals



Note: Fraud sample n=24 and No fraud sample = 26

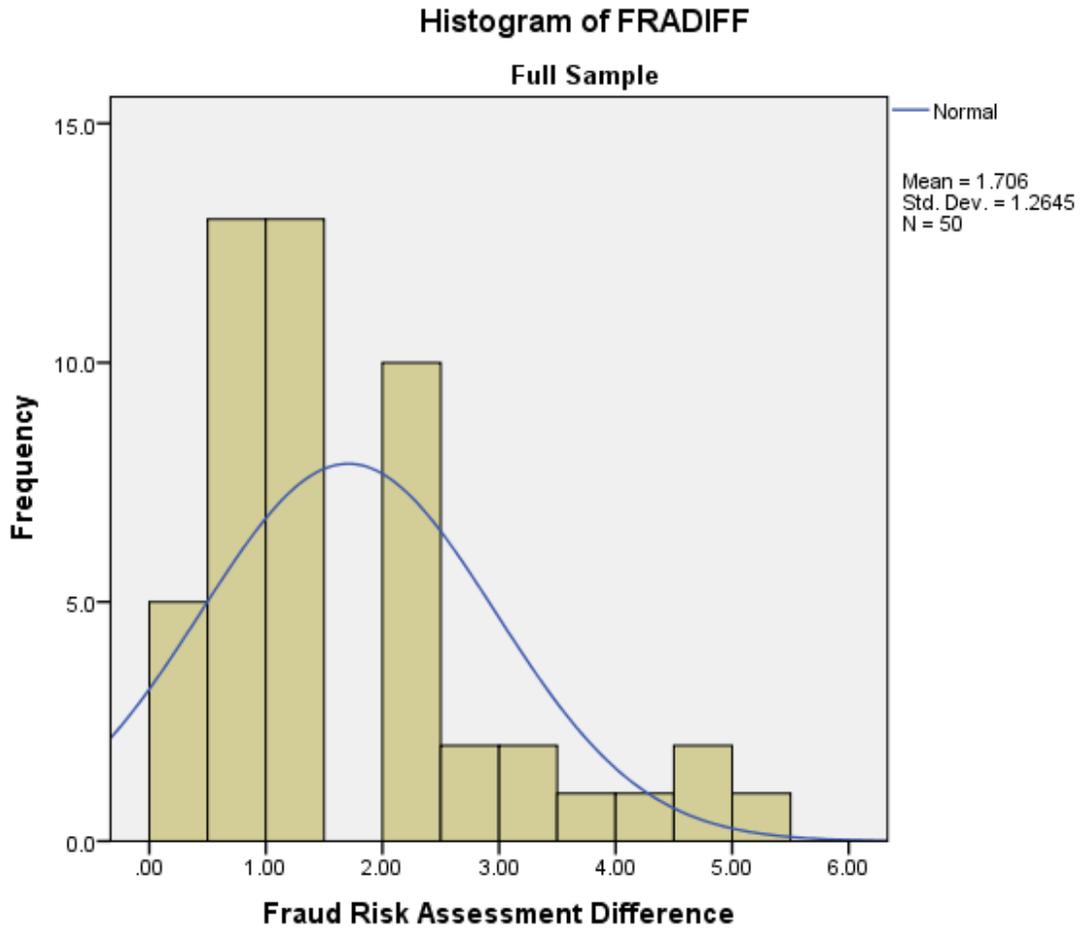
Figure 4.4. Boxplots of predictor variables for fraud and no fraud samples

Boxplots of Predictor Variables



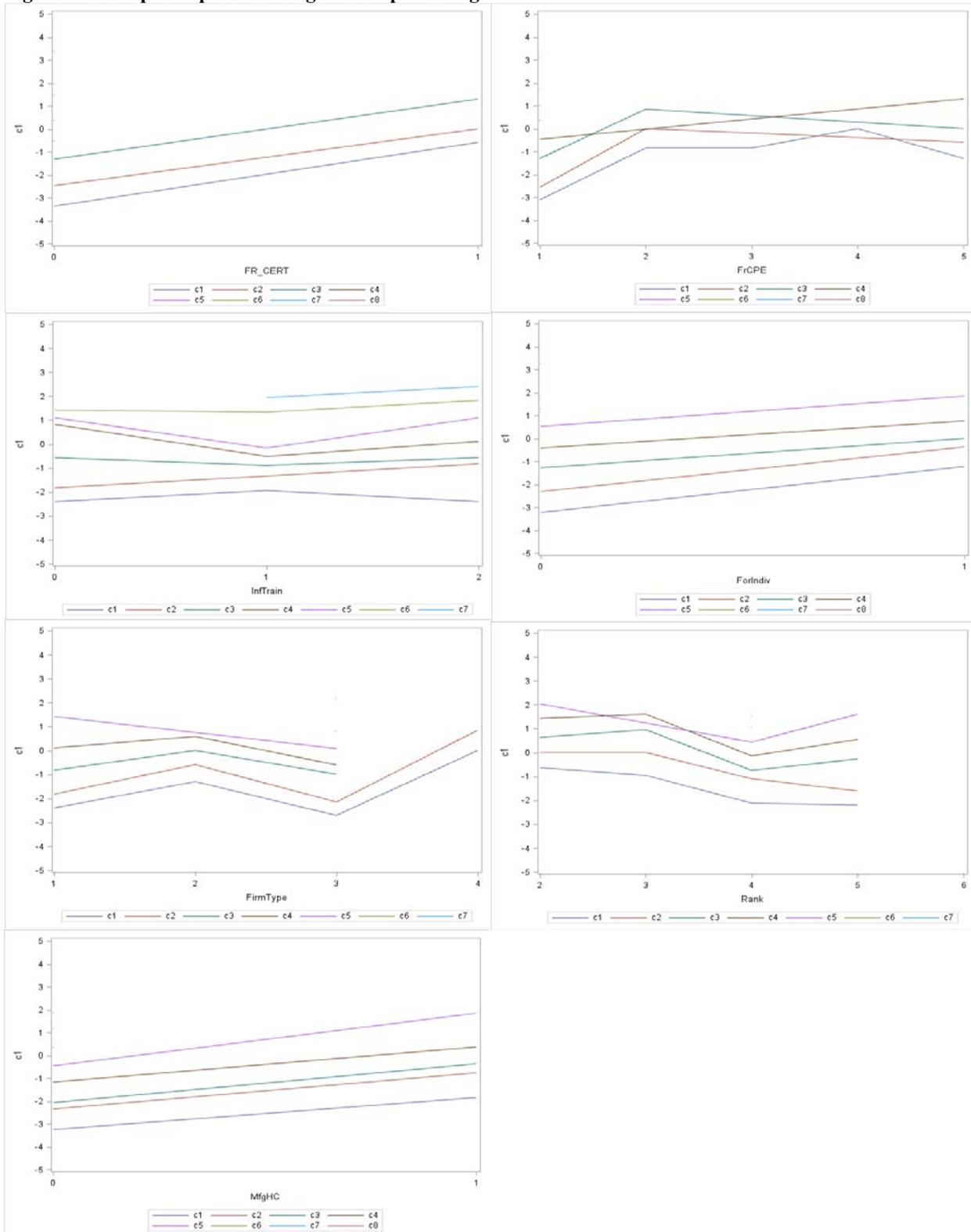
Note: These figures are boxplots of the predictor variables with participant outliers highlighted. The length of the box represents the Interquartile Range (IQR) [distance between 25th and 75th percentiles] with the solid horizontal line representing the median. The whiskers represent the bottom and top quartiles (excluding outliers). Outliers (between 1.5 IQRs and 3 IQRs) are represented by circles and extreme values (more than 3 IQRs) are represented by stars.

Figure 4.5. Histogram of FRADIFF variable



Note: This represents the histogram for the FRADIFF model with a normal curve overlay for the total sample (n=50). The normal curve for each is set to the mean of 1.706 and standard deviation of 1.2645.

Figure 4.6. Graphs of predictors against empirical logits

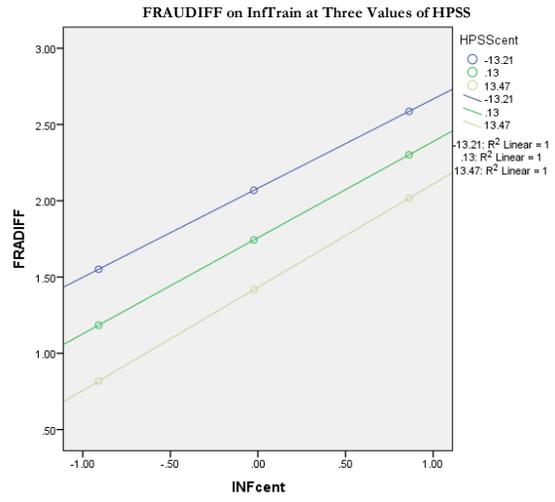
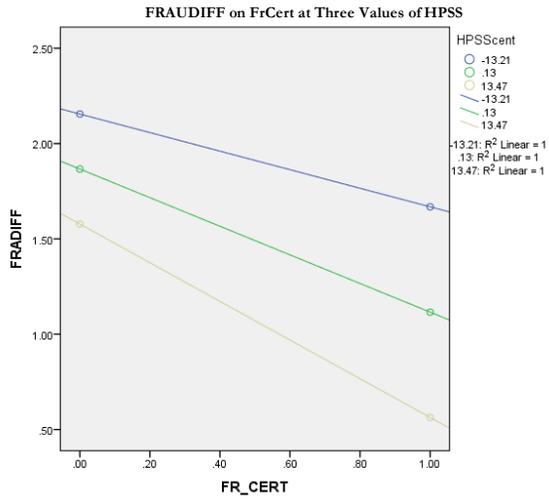


Note: These graphs represent a visual representation of the proportional odds test and graphs each of the categorical predictor variables against the empirical logits.

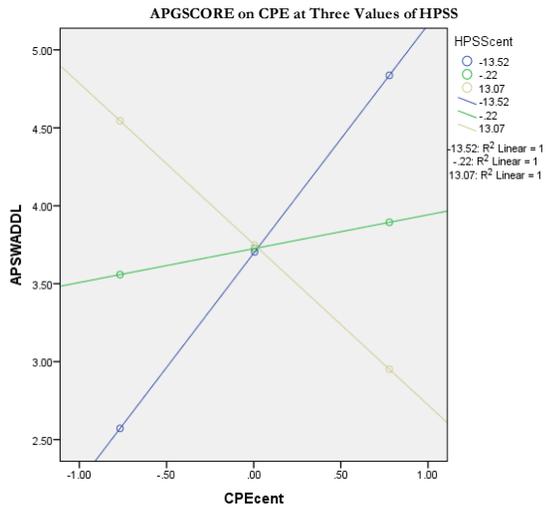
Figure 5.1. Selected graphs of interactions

Selected Interaction Graphs

Panel A. FRADIFF interaction model



Panel B. APGSCORE interaction model



TABLES

Table 2.1 Topics covered or recommended in courses

Authors	Critical thinking	Fraud prevention and detection	Financial Statement Fraud	Red flags	Risk assessments	Fraud schemes	Audit responses to fraud risks	Hands-on experience	Digital environment	Other behavioral sciences	Ethics
Curtis 2008a										X	X
Curtis 2008b		X	X	X		X			X		X
Fleming et al. 2008	X	X	X	X	X	X	X	X	X		X
Kranacher et al. 2008		X	X	X					X	X	X
Kresse 2008	X	X	X	X	X	X					X
Pearson and Singleton 2008									X		
Ramamoorti 2008										X	
Young 2008	X	X	X	X	X	X	X	X	X	X	X
Rezaee 1996		X	X	X		X	X	X	X	X	X
Smith & Crumbley 2009 Auditing/Fraud Examination Focused			X	X	X	X			X		

Table 3.1 Variable name, descriptions, and scoring options

Variable Name	Variable Description	Full Scoring	Collapsed Scoring
Dependent Variables			
FRADIFF	Difference between the participant's fraud risk assessment and the benchmark panel's mean assessment	0-10	0-10
APGSCORE	Total number of participant's audit program (APG) procedure selections that match the benchmark panel's mean selection within an 80% confidence interval.	0-14 (fraud) 0-12 (no fraud)	0-14 (fraud) 0-12 (no fraud)
OUMSCORE	Net sum number of participant's APG procedure selections that are deemed over (+1), under (-1), or matches (0) to the benchmark panel's mean selection within one (1) standard deviation		-14 to 14 (fraud) -12 to 12 (no fraud)
Independent Variables			
FraudExp	Total financial statement fraud related task-specific experience score	0-3 (2 factors = managing other, performing work)	0- No prior experience, 1- Dealt w/ on a few, 2-Dealt w/ on a number of occasions.
FrCert	Indicator variable, 1 if fraud-related certification, 0 otherwise.	0,1	0,1
FrEduc	1-fraud-related course, 2-fraud minor/concentration, 3-fraud certificate, 4-fraud master's (<i>categorical variables</i>)	3 dummy variables by type of education	None
CPE	Total number of hours in fraud-related training	Continuous score	0- Less than 2 hours, 1- 2-8 hours, 2- more than 8 hours
InfTrain	"0"- Never, "1"- 1-2 x/year, "2"- 4-12 x/year, "3"- weekly (<i>categorical variables</i>)	3 dummy variables	0- Never, 1- 1-2 times per year, 2- more than 2 times per year
HPSS	Trait professional skepticism score (30-180)	30-180	30-180
FrInd	Indicator variable, 0 if no fraud scenario treatment condition; 1 if fraud scenario treatment condition	0,1	0,1
Possible Controls			
GenAudExp	Total sales and accounts receivables related task-specific experience score	0-3 (2 factors = managing other, performing work)	None
Rank	1-Senior, 2-Manager, 3-Sr. Mgr, 4-Partner, 5-Other	3 dummy variables by rank	0- Senior Associate, 1- Manager, 2- Senior Manager, 3- Partner
Industry Years	Number of years in current industry	Continuous score in months	None
Industry	1-Mfg., 2-Healthcare	0,1	0,1
FirmType	1-Big4, 2-Mid-tier, 3-Regional/Local, 4-Other	2 dummy variables by firm type	None
ForIndiv	Self-identifies as a forensic accountant	0,1	None

Table 3.2 Panel A. Pre-test #2 descriptive statistics

Descriptive Statistics					
	N	Mean	Std. Dev.	Minimum	Maximum
Total Time	13	37.29	17.60	14.15	82.77
Fraud Risk Assessment – No seeded fraud	7	4.7	2.21	2	8
Fraud Risk Assessment – Seeded fraud	6	7	2.61	2	9

Panel B. Pre-test #2 Manipulation checks

	Manipulation Checks			
	# (%) Correct		# (%) Incorrect	
	Fraud	No Fraud	Fraud	No Fraud
In the Precision case, the new marketing strategy started mid-year.	1 (17%)	7 (100%)	5 (83%)	0 (0%)
In the Precision case, an authorized distributor that agreed to participate in the marketing program was required to sign a promissory note.	5 (83%)	3 (43%)	1 (17%)	4 (57%)

Table 3.3 Pilot test manipulation checks

	Manipulation Checks				T-Test
	# (%) Correct		# (%) Incorrect		
	Fraud	No Fraud	Fraud	No Fraud	
In the Precision case, the new marketing strategy started in July .	14 (86%)	12 (80%)	2 (14%)	3 (20%)	4.714*
In the Precision case, an authorized distributor that agreed to participate in the marketing program was required to sign a promissory note.	9 (56%)	8 (53%)	7 (44%)	7 (47%)	0.652 ^{n.s.}

* $p < 0.0001$ (one-tailed), n.s. not significant

Table 4.1. Demographic statistics

Demographic Statistics		
Firm Type (n=51)		
Big Four		39.2%
Non-Big Four		60.8%
Current position (n=51)		
Senior associate		25.5%
Manager		17.6%
Senior manager		29.4%
Partner		27.5%
Classified as forensic accountant or both forensic and auditor (n=51)		
Yes		19.6%
No		79.4%
Has CPA or CA (n=48)		
Yes		93.7%
No		6.3%
Has fraud-related certification (i.e., CFE, CFF) [n=48]		
Yes		12.5%
No		87.5%
Has had formal fraud education (e.g., university course, certificate or degree) [n=51]		
Yes		5.9%
No		94.1%
Professional skepticism (n=51)		
Range (Mean)	112-159	(136.08)
[Median] <Std. Dev.>	[134.0]	<13.139>
Years of Audit/Forensic experience (n=50)		
	Audit	Forensic
Less than 2 years	5.9%	80.3%
2-3.9 years	13.7%	2.0%
4-5.9 years	11.8%	2.0%
6-7.9 years	7.8%	3.9%
8-9.9 years	15.7%	2.0%
10-11.9 years	19.6%	2.0%
12-13.9 years	3.9%	0.0%
14 or more years	21.6%	7.8%

Table 4.2. Manipulation checks

	Manipulation Checks				
	# (%) Correct		# (%) Incorrect		T-Test
	Fraud	No Fraud	Fraud	No Fraud	
In the Precision case, the new marketing strategy started in July . *p<0.0001 (one-tailed)	23 (92.0%)	19 (73.1%)	2 (8.0%)	7 (26.9%)	6.560*

Table 4.3. Summary of exploratory factor analysis of experience and professional skepticism variables

Item	Rotated Factor Loadings							
	SK	SJ	IU	SC	SD	AE	FE	QM
Developing audit program procedures related to revenues and accounts receivable while on engagements	.223	-.042	-.092	-.029	-.123	.777	.028	.028
Reviewing the audit program related to revenues and accounts receivable while on engagements	-.183	-.032	.291	.083	.065	.746	.094	.038
Responding to peers' and/or subordinates' requests for assistance regarding revenues and accounts receivable audit program development	.129	.022	-.119	-.032	.025	.810	-.037	.064
Reviewing the test work of others related to potential intentional material misstatements while on engagements	-.095	-.279	.093	.132	-.201	-.133	.648	.240
Developing audit program procedures related to specific alleged fraud schemes while on engagements	.088	.157	-.199	-.065	.055	.056	.695	.054
Advising others regarding potential intentional material misstatement red flags and client fraud risk	-.047	-.028	.063	.040	-.003	.009	.634	.200
Advising others regarding audit program development related to specific alleged fraud schemes	.155	.225	-.038	-.137	.066	.192	.713	-.071
The prospect of learning excites me.	.910	-.007	-.199	-.046	-.041	.130	-.086	.093
Discovering new information is fun.	.825	.158	.053	.040	-.052	-.065	-.015	-.024
I think that learning is exciting.	.944	-.044	.066	-.118	.006	.168	.068	-.035
I like searching for knowledge.	.760	.033	.165	.149	-.131	-.007	.102	-.165
I enjoy trying to determine if what I read or hear is true.	.359	.043	.021	.104	-.094	-.293	.076	.353
I relish learning.	.747	-.223	.247	-.030	.138	.036	.028	.070
I wait to decide on issues until I can get more information.	.025	.771	-.033	-.068	.158	.116	-.279	.146
I take my time when making decisions.	-.014	.844	.065	.258	-.031	.134	.018	.036
I dislike having to make decisions quickly.	-.064	.727	.169	-.049	.003	-.032	.198	.042
I don't like to decide until I've looked at all of the readily available information.	-.063	.567	.224	-.045	-.183	.031	.003	.015
I like to ensure that I've considered most available information before making a decision.	.070	.822	-.098	-.047	.050	-.308	.156	-.232
I am interested in what causes people to behave the way that they do.	.118	.167	.609	-.027	-.090	.019	-.139	.225
Other peoples' behavior doesn't interest me.*	-.123	-.050	.634	.051	.321	.014	.080	-.179
I like to understand the reason for other peoples' behavior.	.066	.265	.649	-.076	-.061	-.071	-.014	.121
I seldom consider why people behave in a certain way.*	.123	.043	.819	.037	.083	.051	-.023	-.151
The actions people take and the reasons for those actions are fascinating.	.045	.036	.791	-.117	-.211	-.056	-.036	.201
I feel good about myself.	-.071	.148	-.147	.739	-.082	.055	-.245	-.057
I am confident of my abilities.	.088	.075	-.146	.766	-.125	.065	.013	.259
I am self-assured.	-.024	-.057	-.213	.746	.031	-.061	.194	.049
I don't feel sure of myself.*	.101	.061	.154	.748	.306	.020	.013	-.137
I have confidence in myself	-.061	-.108	.235	.740	-.048	-.008	-.026	-.097
I often accept other peoples' explanations without further thought.*	.012	-.108	.064	.042	.857	-.041	-.002	.027
I tend to immediately accept what other people tell me.*	.070	.066	.084	.058	.288	-.002	-.099	.215
I usually accept things I see, read or hear at face value.*	.306	-.140	.014	.074	.597	-.193	-.114	.096
I usually notice inconsistencies in explanations.	.000	.007	.075	-.127	.322	-.416	-.119	.137
Most often I agree with what the others in my group think.*	-.112	.009	-.077	.000	.721	.123	-.002	.404
It is easy for other people to convince me.*	-.207	.242	-.050	-.102	.530	-.071	.083	.102
I often reject statements unless I have proof that they are true.	.022	.353	.040	.072	.171	-.057	.046	.513
My friends tell me that I usually question things that I see or hear.	-.212	-.030	.131	-.048	.241	.209	.126	.698
I frequently question things that I see or hear.	.209	-.100	-.145	-.039	.227	-.058	.154	.688
Eigenvalues	6.988	4.788	3.914	2.837	2.459	2.084	1.968	1.447
% of variance	18.886	12.940	10.579	7.668	6.647	5.631	5.320	3.991
Cronbach's a	.900	.862	.865	.840	.745	.826	.771	.748

Extraction Method: Principal Axis Factoring.

Rotation Method: Promax with Kaiser Normalization.

Note: Factor loadings over 0.40 appear in **bold**. Items marked with a * were reverse coded. **SK**=Search for Knowledge; **SJ** = Suspension of Judgment; **SD** = Self-Determining; **IU** = Interpersonal Understanding; **SC** = Self-Confidence; **QM** = Questioning Mind; **AE** = General Audit Experience; **FE** = Direct Fraud Experience

Table 4.4. Descriptive statistics

Descriptive Statistics

		Dependent Variables			Independent Variables					Potential Control Variables			
		FRADIFF	APGSCORE	OUMSCORE	FraudExp	FrCert	CPE	InfTrain	HPSS	Big4	Rank	MfgHC	AuditExp
N	Valid	51	50	50	51	48	51	46	51	51	51	51	51
	Missing	0	1	1	0	3	0	5	0	0	0	0	0
Mean		1.6971	3.4800	-4.4400	0.3725	.1250	0.4706	1.0000	136.0784	.3922	1.5882	.1961	0.8431
Median		1.2500	3.0000	-6.0000	0.0000	0.0000	0.0000	1.0000	134.0000	0.0000	2.0000	0.0000	1.0000
Std. Deviation		1.25342	1.99223	6.14505	.59869	.33422	.75771	.86923	13.13902	.49309	1.15198	.40098	.64413
Variance		1.571	3.969	37.762	.358	.112	.574	.756	172.634	.243	1.327	.161	.415
Skewness		1.234	.248	1.492	1.390	2.342	1.252	0.000	.042	.455	-.183	1.578	.153
Std. Error of		.333	.337	.337	.333	.343	.333	.350	.333	.333	.333	.333	.333
Kurtosis		1.031	-.298	1.534	.977	3.633	-.034	-1.698	-.926	-1.868	-1.398	.508	-.551
Std. Error of		.656	.662	.662	.656	.674	.656	.688	.656	.656	.656	.656	.656
Minimum		.25	0.00	-12.00	0.00	0.00	0.00	0.00	112.00	0.00	0.00	0.00	0.00
Maximum		5.33	8.00	12.00	2.00	1.00	2.00	2.00	159.00	1.00	3.00	1.00	2.00
Percentiles	25	.7500	2.0000	-8.2500	0.0000	0.0000	0.0000	0.0000	128.0000	0.0000	0.0000	0.0000	0.0000
	50	1.2500	3.0000	-6.0000	0.0000	0.0000	0.0000	1.0000	134.0000	0.0000	2.0000	0.0000	1.0000
	75	2.3300	5.0000	-3.0000	1.0000	0.0000	1.0000	2.0000	148.0000	1.0000	3.0000	0.0000	1.0000

Note: Table presents descriptive statistics for dependent, independent, and potential variables. See **Table 3.1** for variable definitions. FraudExp, CPE, InfTrain, HPSS, Rank, and AuditExp were mean centered for regression analyses.

Table 4.5. Pearson correlation table

Correlations														
N=42	FRADIFF	APGSCORE	OUMSCORE	FraudExp	FrCert	CPE	InfTrain	HPSS	Big4	ForIndiv	Rank	MfgHC	AuditExp	FRIND
FRADIFF	1													
APGSCORE	-.146	1												
OUMSCORE	.032	-.011	1											
FraudExp	.015	.199	.051	1										
FrCert	-.116	-.097	.215	.156	1									
CPE	.093	-.164	.129	.222	.280	1								
InfTrain	.354*	-.101	.223	-.025	.241	.158	1							
HPSS	-.213	.201	.157	.147	.238	.266	-.037	1						
Big4	-.045	-.086	.042	.022	-.216	.153	-.194	.233	1					
ForIndiv	-.115	-.095	.249	.106	.782**	.358*	.407**	.262	.017	1				
Rank	.111	.194	.425**	.327*	-.036	.251	-.080	.196	.057	.061	1			
MfgHC	.146	-.358*	-.086	-.042	-.198	.253	.355*	-.059	.070	.042	-.228	1		
AuditExp	.049	-.213	-.262	.117	-.418**	.112	-.213	-.200	.000	-.490**	.045	.217	1	
FRIND	.095	.119	-.249	-.229	.000	.000	-.188	.257	.096	-.174	-.131	.000	-.037	1

*. Correlation is significant at the 0.05 level (2-tailed).

** . Correlation is significant at the 0.01 level (2-tailed).

Table 4.6. Fraud risk assessment analyses - OLS

Fraud risk assessment model (FRADIFF) - OLS

	Unstandardized Coefficients		Standardized Coefficients	t	2-tail Sig.	90.0% Confidence Interval for B		Collinearity Statistics
	B	Std. Error	Beta			Lower Bound	Upper Bound	VIF
Model n=43								
(Constant)	1.461	.285		5.124	.000	.980	1.943	
FraudExp	.321	.312	.157	1.027	.156	-.206	.848	1.166
FrCert	-.842	.563	-.229	-1.496	.072	-1.791	.108	1.176
CPE	.225	.260	.134	.866	.196	-.214	.663	1.200
InfTrain	.627	.219	.432	2.869	.003	.258	.996	1.134
HPSS	-.024	.015	-.252	-1.593	.060	-.050	.001	1.253
FRIND	.761	.396	.299	1.923	.031	.093	1.429	1.210
F (p-value)	2.335 (.05)							
R ²	0.280							
Adjusted R ²	0.160							
Durbin-Watson	1.919							

a. Dependent Variable: FRADIFF

Note: FraudExp, CPE, InfTrain, and HPSS are mean centered. See **Table 3.1** for variable definitions.

Table 4.7. Audit program modification regression (APGSCORE) – OLS

Audit program modifications model (APGSCORE) - OLS

	Unstandardized Coefficients		Standardized Coefficients	t	2-tail Sig.	90.0% Confidence Interval for B		Collinearity Statistics
	B	Std. Error	Beta			Lower Bound	Upper Bound	VIF
Model n=42								
(Constant)	3.779	.484		7.803	.00	2.959	6.449	
FraudExp	.975	.502	.303	1.943	.03	.126	1.824	1.208
FrCert	-2.147	1.026	-.375	-2.092	.02	-3.884	-.410	1.596
CPE	-.158	.442	-.060	-.357	.36	-0.905	.590	1.407
InfTrain	.285	.386	.126	0.739	.23	-.368	0.938	1.446
HPSS	.023	.025	.150	0.932	.18	-.019	.065	1.292
MfgHC	-1.964	.877	-.385	-2.240	.02	-3.448	-0.481	1.466
AuditExp	-.774	.529	-.252	-1.462	.08	-1.669	0.122	1.471
FRIND	0.658	.629	.164	1.047	.15	-0.406	1.722	1.222
F (p-value)	2.077 (.07)							
R ²	0.335							
Adjusted R ²	0.174							
Durbin-Watson	2.279							

a. Dependent Variable: APGSCORE

Note: FraudExp, CPE, InfTrain, and HPSS are mean centered. See **Table 3.1** for variable definitions.

**Table 4.8. Interactions between professional skepticism and fraud detection proficiency – FRADIFF model
Fraud risk assessment model (FRADIFF) - OLS**

	Unstandardized Coefficients		Standardized Coefficients	t	2-tail Sig.	90.0% Confidence Interval for B		Collinearity Statistics
	B	Std. Error	Beta			Lower Bound	Upper Bound	VIF
N=42								
(Constant)	1.515	.293		5.171	.000	1.019	2.011	
FraudExp	.335	.325	.164	1.031	.155	-.215	0.884	1.238
FrCert	-0.515	0.640	-.140	-0.805	.214	-1.597	.568	1.494
CPE	.472	.310	.282	1.523	.069	-.053	0.998	1.685
InfTrain	.631	.228	.435	2.766	.005	.245	1.017	1.213
HPSS	-.034	.019	-.356	-1.826	.039	-.066	-.003	1.873
HPSS*FrCert	.837	.407	.329	2.056	.024	.148	1.526	1.260
HPSS*CPE	-0.018	.042	-.084	-0.438	.332	-0.088	.052	1.812
HPSS*InfTrain	-.043	.030	-.280	-1.419	.083	-0.094	.008	1.910
FRIND	.011	.018	.098	0.616	.271	-.020	.042	1.232
F (p-value)	1.794 (.11)							
R ²	0.329							
R ² change	0.048 (p=0.51)							
Adjusted R ²	0.145							
Durbin-Watson	1.934							

a. Dependent Variable: FRADIFF

Note: FraudExp, CPE, InfTrain, and HPSS are mean centered. See **Table 3.1** for variable definitions.

**Table 4.9. Interactions between professional skepticism and fraud detection proficiency – APGSCORE model
Audit program modifications model (APGSCORE) - OLS**

	Unstandardized Coefficients		Standardized Coefficients	t	2-tail Sig.	90.0% Confidence Interval for B		Collinearity Statistics
	B	Std. Error	Beta			Lower Bound	Upper Bound	VIF
N=42								
(Constant)	3.870	.465		8.327	.000	3.083	4.658	
FraudExp	.916	.480	.285	1.907	.033	.102	1.729	1.212
FrCert	-1.315	1.062	-.230	-1.238	.112	-3.114	.484	1.872
CPE	.315	.481	.120	.655	.259	-.500	1.131	1.831
InfTrain	.226	.370	.100	.611	.273	-.400	.852	1.455
HPSS	-.004	.027	-.024	-.134	.447	-.049	.042	1.688
HPSS*CPE	-.090	.044	-.377	-2.040	.025	-.165	-0.015	1.857
MfgHC	-1.956	.838	-.384	-2.336	.013	-3.375	-.537	1.466
AuditExp	-.712	.506	-.232	-1.405	.085	-1.569	.146	1.476
FRIND	.701	.601	.175	1.167	.126	-.316	1.719	1.223
F (p-value)	2.485 (.03)							
R ²	0.411							
R ² change	0.076 (p=0.05)							
Adjusted R ²	0.246							
Durbin-Watson	2.087							

a. Dependent Variable: APGSCORE

Note: FraudExp, CPE, InfTrain, and HPSS are mean centered. See **Table 3.1** for variable definitions.

Table 4.10. Audit program modification over-auditing models

Audit program modification over-auditing model (OUMSCORE) - OLS

	Unstandardized Coefficients		Standardized Coefficients	t	2-tail Sig.	90.0% Confidence Interval for B		Collinearity Statistics
	B	Std. Error	Beta			Lower Bound	Upper Bound	VIF
Model n=42								
(Constant)	-3.486	1.457		-2.392	.01	-5.950	-1.022	
FraudExp	-1.944	1.620	-.186	-1.200	.12	-4.683	.796	1.246
FrCert	3.846	2.855	.207	1.347	.09	-.981	8.674	1.222
CPE	-.572	1.321	-.067	-.433	.33	-2.805	1.662	1.245
InfTrain	1.306	1.093	.178	1.194	.12	-.543	3.155	1.149
HPSS	.062	.077	.126	.806	.21	-.069	.193	1.268
FRIND	-2.979	2.007	-.229	-1.484	.07	-6.373	.416	1.233
RANK	2.807	.928	.469	3.025	.00	1.238	4.375	1.245
F (p-value)	2.529 (.03)							
R ²	0.342							
Adjusted R ²	0.207							
Durbin-Watson	2.090							

a. Dependent Variable: OUMSCORE

Note: FraudExp, CPE, InfTrain, HPSS, and Rank are mean centered. See **Table 3.1** for variable definitions.

APPENDIX A. SCENARIO BACKGROUND INFORMATION

Assume that you have been assigned to **update an audit program, as applicable, for the revenue cycle** of Precision Equipment, Inc. (Precision) for the year ended December 31, 2012. Please read the following information, which includes descriptions of the company's business and industry, management, the control environment, and the revenue cycle, as well as selected ratios and summary financial statements. After you read the information, you will be asked to make various risk assessments and to update the audit program based on the information gathered and procedures performed by your audit team.

Background Information

Client Background

Precision, a manufacturer of medical equipment, is a publicly traded corporation. It was founded in 1960, and is headquartered in Woonsocket, Rhode Island. Precision employs about 20,000 people and maintains operations in nine countries outside the United States. The company develops, manufactures and markets medical measurement products including digital and analog thermometers, blood pressure kits, CAT scanners, MRI machines and glucometers.

Precision's principal customers are hospitals, physicians, nursing homes, and mass merchandisers. The company's products and services are marketed both through independent distribution channels and directly to end-users. The segments of the industry in which Precision does business continue to be characterized by significant competition between suppliers, both in the United States and abroad. Primary competitive factors are product performance, technology, customer service, product availability and price. The company believes that its reputation for high quality in the marketplace is a significant, positive competitive factor.

Since the early 2000s, the company has been undergoing substantial changes and faces major strategic challenges. The company's business historically had centered on the sale of analog instruments. However, beginning around 2008, digital instruments gained popularity. In fact, sales of analog instruments industry-wide have fallen about 8% each year since 2008. Precision was a late entrant into the digital market and remains behind other industry leaders in converting its production and sales to digital. Accordingly, the company is working to increase its sales in this critical and growing market segment. At the same time, the company seeks to maximize its traditional analog devices sales, which—while diminishing over time—continue to account for 70% of its revenues.

Prior and Current Years' Audits

Your firm has audited Precision since 1984 and has issued standard unqualified integrated audit reports in each of those years. Based on a review of current standards, you have determined that there were no significant changes in any accounting or auditing standards that would affect this year's audit.

Industry Analysis

Considered the most complex and diversified area in the health-care industry, the medical products and devices category encompasses more than 130,000 different items, ranging from gauze pads to sophisticated electronic diagnostic machines that can cost several million dollars each. Standard and Poor's projects that the industry growth rate will slow in the coming years. The principal culprits are cost-containment pressures in primary markets, heightened scrutiny by the FDA in its approval of new products, controls imposed by managed care providers, and proposed new excise taxes (as a part of "Obamacare"). Other industry characteristics are proposed cutbacks in Medicare coverage and payment policies, which represent another negative factor confronting the industry, as well as steady declines in stock share prices since 2010.

While the US remains the world's largest supplier of medical products by a wide margin, this dominance is slipping. It is expected that customers (independent distributors and hospitals) are likely to be big winners as manufacturers provide innovative and lucrative incentives to market their products in what is becoming a very competitive field.

Selected industry ratios are presented below:

Ratio	2012	2011
Profit margin on sales	8.86	8.92
Current ratio	1.93	1.96
Inventory turnover	2.33	2.41
A/R turnover	5.92	6.45

Assessment of Management, Judgment of Materiality, and the Control Environment

Management. Your firm's past experience with Precision indicates that management conscientiously prepares accounting estimates and uses sound judgment in the preparation of the financial statements. Top management is compensated through a base salary (50%), an earnings-based bonus plan (30%) and stock options (20%). As with most public companies in the industry, there is significant pressure for management to meet analysts' earnings forecasts. Management places great importance on achieving or exceeding sales and other financial forecasts. The company has met or exceeded sales goals for 12 consecutive quarters. The management team is well respected in the business community and turnover among top management has been infrequent.

Materiality. After reviewing last year's financial statements and the current year unaudited financial statements, materiality for planning purposes has been set at \$8,000,000.

Control Environment. Management appears to have a positive attitude about maintaining a reliable control environment and relies on the information generated from the accounting system to make management decisions. In general, the control system is reliable in recording routine transactions and the segregation of duties is adequate. The board of directors and the audit committee meet regularly. The audit committee is made up of three non-management directors.

The president of the company maintains a high degree of control over management and over financial reporting.

Your firm's tests indicate computer and manual controls over processing of routine revenue transactions are in place and effective. During planning, the engagement team performed a risk assessment around the revenue cycle. Based on the procedures performed a preliminary risk assessment of moderate was assessed for inherent and fraud risk and low for control risk.

Overview of the Revenue Cycle

Precision's products and services are marketed both through independent distribution channels and directly to end-users. Revenue is recognized when products are shipped to customers. The company's normal payment terms (i.e., n/45 days) and bad debt estimates have been close to the industry average.

The company maintains adequate segregation of duties including segregating the recording of sales orders, cash receipts and authorization activities. The authorization process for the revenue cycle requires approvals in three circumstances: 1) initial and additional customer credit approval by the credit department, 2) sales order approval from managers or supervisors for sales over \$75,000, and 3) shipment approval (i.e., picking ticket from approved customer order).

Precision follows standard business practices on internal controls such as using an online-batch processing system for orders, real-time customer credit limit checks, and a perpetual inventory system that requests and restricts items ordered from being shipped to other customers. Other examples include comparing batch totals daily and promptly investigating differences, investigating overdue accounts receivable balances, resolving differences in perpetual inventory, and reconciling general and subsidiary ledgers.

APPENDIX B. SCENARIO ROLL-FORWARD PROCEDURES AND MARKETING PLAN

FRAUD MANIPULATION IN BOLD [NO FRAUD MANIPULATION IN BRACKETS]

Roll-Forward Tests

The controller and interim tests of controls indicate that there have been no changes in the revenue cycle since the prior year. The only change was the implementation of a marketing program in **NOVEMBER** [JULY] in response to distributor incentives granted by key competitors. The marketing program increased revenue and net income by **\$84 MILLION AND \$35.2 MILLION** [\$14 MILLION \$5.2 MILLION], respectively. Key company personnel revealed that Precision felt it was necessary to take this action in response to market changes and competitor actions. Your staff gathered the following information about the company's **NOVEMBER** [JULY] marketing strategy.

Marketing Strategy

In **LATE** [MID-] 2012, management decided to reallocate marketing responsibilities among its sales force of employees and authorized distributors in order to best meet its strategic goals. Management believes that by giving the distributors primary sales responsibility for the traditional analog segment of its product line, the company's direct sales force could devote increased resources and efforts to the sale of the digital products.

In **NOVEMBER** [JULY] 2012, Precision launched a new marketing program where distributors were asked to purchase a **MINIMUM** [SUGGESTED] number of analog systems. The **MINIMUM** [PROPOSED] purchase amount was based on the inventory of analog devices (1.8 million units) divided by the pro-rata share of overall distributor sales. Precision offered end-user incentives (discussed below) to buy from the distributors, which should help distributors resell inventory purchased from the promotion. Precision also offered several incentives, including profit-sharing opportunities, directly to distributors to encourage them to participate in the program.

The program provided distributors with access to large retail accounts, such as hospitals and physicians that had previously been serviced by Precision directly. It also permitted profit sharing resulting from increases in market share. Other sales boosting initiatives included the "Premier Digital" program through which retailers earned frequent-flyer type points to obtain discounts on digital units purchased.

Precision **REQUIRED** [OFFERED] promissory notes for program purchase amounts where all amounts owed to Precision would have to be satisfied in full within **SIX (6)** [TWELVE (12)] months. The terms of the note **REQUIRE** [INDICATE] payments **TO** [WILL] coincide with expected product sell-through with a "balloon" payment for remaining balances at the end of **SIX** [12] months, which is estimated to be approximately **70%** [20%] of the program purchases.

On **NOVEMBER** [JULY] 13, 2012, Precision held a meeting with its distributors to present them the program. The marketing initiative was largely successful with distributors signing up for large orders of analog systems. About 70% of the distributors signed immediately.

FOLLOW-UPS WITH THE UNDECIDED DISTRIBUTORS PROVED SUCCESSFUL WITH ONLY 4 NOT SIGNING BY YEAR-END. SEVERAL DISTRIBUTORS INDICATED, DURING AND AFTER THE NOVEMBER 13 MEETING, THAT THEY DID NOT HAVE SUFFICIENT CAPACITY TO STORE ADDITINOAL PRODUCTS IN THEIR WAREHOUSES. AS AN ACCOMMODATION TO THESE DISTRIBUTORS, PRECISION ARRANGED TO HIRE FREIGHT FORWARDERS AND WAREHOUSE FACILITIES.

On **DECEMBER** [AUGUST] 10, 2012, the controller prepared a summary memorandum requesting credit limit increases for 11 distributors. Top management approved the requested credit limit increases based upon this summary memorandum.

At this point, management is quite pleased with the success of the marketing strategy.

APPENDIX C. SCENARIO RATIOS AND FINANCIAL STATEMENTS

Ratio analysis and Financial Statements

Selected financial statement ratios are presented below, along with the unaudited consolidated financial statements for 2012 and the audited financial statements for 2011.

	FRAUD	NO FRAUD	
SELECTED RATIOS:	12/31/12	12/31/12	12/31/11
Profit margin on sales: net income/ net sales	9.10%	8.82%	10.03%
Current ratio: current assets / current liabilities	2.08	2.02	2.20
Inventory turnover: cost of sales / inventory	2.85	2.55	2.64
A/R turnover: net sales / accounts receivable	4.35	5.08	5.85

Precision Equipment, Inc. Consolidated Statements of Operations for the Years Ended (In Thousands of Dollars Except Per Share Data)						
	FRAUD		NO FRAUD			
	12/31/2012 (Unaudited)	% of Net Sales	12/31/2012 (Unaudited)	% of Net Sales	12/31/2011 (Audited)	% of Net Sales
Net sales	\$ 1,914,318		\$ 1,830,050		\$ 1,709,086	
Costs of products sold	853,975	44.6	828,883	45.3	778,684	45.6
Selling, administrative, and general	725,608	37.9	668,436	36.5	606,889	35.5
Other (income) expenses	71,425	3.7	98,925	5.4	66,968	3.9
Provision for income taxes	89,118	4.7	72,404	4.0	85,125	5.0
Net earnings	<u>\$ 174,192</u>	9.1	<u>\$ 161,402</u>	8.8	<u>\$ 171,420</u>	10.0
Earnings per share	<u>\$ 2.89</u>		<u>\$ 2.68</u>		<u>\$ 2.84</u>	

Precision Equipment, Inc. Consolidated Balance Sheets (In Thousands of Dollars)					
	FRAUD	NO FRAUD		FRAUD	NO FRAUD
	12/31/2012 (Unaudited)	12/31/2012 (Unaudited)	12/31/2011 (Audited)	% Change	% Change
Assets					
<i>Current Assets:</i>					
Cash and cash equivalents	\$ 446,036	\$ 446,036	\$ 416,773	7.0	7.0
Accounts and notes receivable, less allowances of \$14,357 and 12,818, respectively	439,807	360,139	292,338	50.4	23.2
Inventories	299,662	324,754	294,825	1.6	10.2
Other current assets	233,844	242,201	167,779	39.4	44.4
<i>Total Current Assets</i>	<u>\$ 1,419,349</u>	<u>\$ 1,373,130</u>	<u>\$ 1,171,715</u>	21.1	17.2
Other assets	901,510	932,367	791,974	13.8	17.7
Total Assets	<u>\$ 2,320,859</u>	<u>\$ 2,305,497</u>	<u>\$ 1,963,689</u>	18.2	17.4
Liabilities and Shareholders' Equity					
<i>Current Liabilities:</i>					
Accounts payable and accrued liabilities	\$ 366,646	\$ 365,360	\$ 286,160	28.1	27.7
Other current liabilities	314,745	313,459	245,954	28.0	27.5
<i>Total Current Liabilities</i>	<u>\$ 681,391</u>	<u>\$ 678,819</u>	<u>\$ 532,114</u>	28.0	27.6
Other liabilities	570,312	570,312	408,707	39.5	39.5
<i>Total Liabilities</i>	<u>\$ 1,251,703</u>	<u>\$ 1,249,131</u>	<u>\$ 940,821</u>	33.0	32.8
<i>Total Shareholders' Equity</i>	<u>\$ 1,069,156</u>	<u>\$ 1,056,366</u>	<u>\$ 1,022,868</u>	4.5	3.3
Total Liabilities and Shareholders' Equity	<u>\$ 2,320,859</u>	<u>\$ 2,305,497</u>	<u>\$ 1,963,689</u>	18.2	17.4

APPENDIX D. SCENARIO DEPENDENT VARIABLE QUESTIONS

PART I

Risk Factors

What revenue cycle risk factors exist for the audit of Precision? Risk factors are events or circumstances that significantly heighten the likelihood of the presence of material unintentional or intentional misstatements.

1.

2.

3.

4.

5.

Please refer to the prior background materials to complete this task, if needed.

When you have finished listing the risk factors, please continue.

PART III

Audit Program for the Revenue Cycle

As noted earlier, your main assignment is to **update the audit program, as applicable, for the revenue cycle**. The current program for sales and accounts receivable provided has been rolled forward by a member of your staff based on prior year work papers and standard audit procedures. This program needs to be **tailored based on the information gathered during interim fieldwork performed by your audit team**.

For each of the standard audit procedures included on the next several pages please indicate (with an “X”) whether the procedure should be:

- (1) omitted because it is not applicable to Precision,
- (2) performed on a **random sample** (if applicable) with a sample size assuming **low to medium risk** for the related assertions, or
- (3) modified for Precision (choose as many modifications as applicable):
 - (3a) modified to **increase sample size** for **high risk** at Precision for the assertions,
 - (3b) modified to **focus the sample** on specific accounts or transactions at Precision,
 - (3c) modified in some other way to address risks at Precision (i.e., non-standard questions on confirmations, additional analytical procedures to be performed, etc.)

Please continue to the standard procedures (starting on the next page) and update the procedures as necessary.

Standard Audit Procedures – Sales and Receivables

01. TEST PROPRIETY OF REVENUE RECOGNITION POLICIES AND PROCEDURES - SALES AND RECEIVABLES [Validity, Completeness, Recording, Cutoff]

- omit, not applicable
- perform standard procedure (random sample, low to medium risk)
- increase sample size for high risk, enter percentage (%) increase here _____
- modify to focus (target) sample, describe the targeting here including what percentage (%) of the sample will focus on the target sample _____
- modify in some other way, describe modification here _____

02. TEST PRESENTATION OF SALES AND RECEIVABLES [Presentation]

- omit, not applicable
- perform standard procedure (random sample, low to medium risk)
- increase sample size for high risk, enter percentage (%) increase here _____
- modify to focus (target) sample, describe the targeting here including what percentage (%) of the sample will focus on the target sample _____
- modify in some other way, describe modification here _____

03. TEST SALES AND RECEIVABLES JOURNAL ENTRIES RECORDED IN THE GENERAL LEDGER [Validity, Recording]

- omit, not applicable
- perform standard procedure (random sample, low to medium risk)
- increase sample size for high risk, enter percentage (%) increase here _____
- modify to focus (target) sample, describe the targeting here including what percentage (%) of the sample will focus on the target sample _____
- modify in some other way, describe modification here _____

04. EVALUATE BUSINESS RATIONALE FOR SIGNIFICANT UNUSUAL SALES OR RECEIVABLES TRANSACTIONS [Validity, Recording, Valuation]

- omit, not applicable
- perform standard procedure (random sample, low to medium risk)
- increase sample size for high risk, enter percentage (%) increase here _____
- modify to focus (target) sample, describe the targeting here including what percentage (%) of the sample will focus on the target sample _____
- modify in some other way, describe modification here _____

Please refer to the prior background materials to complete this task, if needed.

Standard Audit Procedures – Sales

01. TEST SALES BALANCES [Validity, Completeness, Recording, Cutoff]

- omit, not applicable
- perform standard procedure (random sample, low to medium risk)
- increase sample size for high risk, enter percentage (%) increase here _____
- modify to focus (target) sample, describe the targeting here including what percentage (%) of the sample will focus on the target sample _____
- modify in some other way, describe modification here _____

02. TEST SALES RETURNS [Completeness, Recording, Cutoff]

- omit, not applicable
- perform standard procedure (random sample, low to medium risk)
- increase sample size for high risk, enter percentage (%) increase here _____
- modify to focus (target) sample, describe the targeting here including what percentage (%) of the sample will focus on the target sample _____
- modify in some other way, describe modification here _____

03. TEST CUT-OFF OF SALES [Cutoff]

- omit, not applicable
- perform standard procedure (random sample, low to medium risk)
- increase sample size for high risk, enter percentage (%) increase here _____
- modify to focus (target) sample, describe the targeting here including what percentage (%) of the sample will focus on the target sample _____
- modify in some other way, describe modification here _____

04. TEST CUT-OFF OF CREDIT MEMOS [Cutoff]

- omit, not applicable
- perform standard procedure (random sample, low to medium risk)
- increase sample size for high risk, enter percentage (%) increase here _____
- modify to focus (target) sample, describe the targeting here including what percentage (%) of the sample will focus on the target sample _____
- modify in some other way, describe modification here _____

Please refer to the prior background materials to complete this task, if needed.

Standard Audit Procedures – Receivables

01. CONFIRM RECEIVABLES [Validity, Recording, Cutoff]

- omit, not applicable
- perform standard procedure (random sample, low to medium risk)
- increase sample size for high risk, enter percentage (%) increase here _____
- modify to focus (target) sample, describe the targeting here including what percentage (%) of the sample
will focus on the target sample _____
- modify in some other way, describe modification here _____

02. TEST THE ALLOWANCE FOR DOUBTFUL ACCOUNTS AND BAD DEBT EXPENSE [Valuation]

- omit, not applicable
- perform standard procedure (random sample, low to medium risk)
- increase sample size for high risk, enter percentage (%) increase here _____
- modify to focus (target) sample, describe the targeting here including what percentage (%) of the sample
will focus on the target sample _____
- modify in some other way, describe modification here _____

03. TEST ALLOWANCES FOR SALES RETURNS AND DISCOUNTS [Valuation]

- omit, not applicable
- perform standard procedure (random sample, low to medium risk)
- increase sample size for high risk, enter percentage (%) increase here _____
- modify to focus (target) sample, describe the targeting here including what percentage (%) of the sample
will focus on the target sample _____
- modify in some other way, describe modification here _____

Please refer to the prior background materials to complete this task, if needed.

In addition to modifying standard procedures, you may wish to **add procedures** that you believe are necessary given the risks at Precision, but that are not included in the standard procedures. At this time, write in any necessary additional procedures on this page. Leave this page blank if no additional procedures are needed for Precision.

Additional Audit Procedures – Sales and Receivables

Please refer to the prior background materials to complete this task, if needed.

When finished with this section, please continue.

APPENDIX E: INDEPENDENT VARIABLES AND DEMOGRAPHIC QUESTIONS

PART IV

Please answer the following questions about yourself and your experience with the case **without referring back to the case**.

1. What type of accounting or consulting firm do you work at?
 - a. Big 4 ____
 - b. Mid-tier ____
 - c. Regional/Local ____

2. Please indicate your job function:
 - a. Auditor ____ (If a. skip to 3.)
 - b. Forensic Accountant ____ (If b. please answer 2b.)
 - c. Both ____ (If c. skip to 3.)

- 2b. How many complete audits have you worked on? _____

3. How much auditing experience do you have? _____ years and _____ months

4. How much forensic accounting experience do you have? _____ years and _____ months

5. Approximately what percentage (%) of your time is spent in your firm's (equivalent) departments:
 - a. Audit ____
 - b. Forensic Accounting ____
 - c. Other ____

6. Please indicate which type of companies you perform engagement services for. Check all that apply.
 - a. Public companies ____
 - b. Private companies ____

7. Please indicate your position.
 - a. Associate
 - b. Senior Associate ____
 - c. Manager ____
 - d. Senior Manager/Director ____
 - e. Director/Managing Director/Partner/Principal ____
 - f. Other ____, Please indicate _____

8. Please indicate any professional certifications you hold? (Check all that apply.)
 - a. CPA ____ Year of Certification _____

- b. CFE ____ Year of Certification _____
- c. CFF ____ Year of Certification _____
- d. Other, please specify _____ Year of Certification _____

9. Please indicate your industry specialization(s)

- a. Most recent: ____ years of experience in _____ industry
- b. Prior: ____ years of experience in _____ industry.

10. In the Precision case, the new marketing strategy started in **July**.

True _____ False _____

11. In the Precision case, an authorized distributor that agreed to participate in the marketing program was **required** to sign a promissory note.

True _____ False _____

12. In the Precision case, what is the likelihood that an intentional material misstatement is present in the 2012 financial statements?

0-----1-----2-----3-----4-----5-----6-----7-----8-----9-----10
 Low Moderate High

13. In the Precision case, what is the likelihood that an unintentional material misstatement is present in the 2012 financial statements?

0-----1-----2-----3-----4-----5-----6-----7-----8-----9-----10
 Low Moderate High

14. Please indicate your level of education. Check all that apply.

- a. Bachelor's degree ____ Year of degree _____
- b. Master's degree ____ Year of degree _____
- c. Fraud/Forensic class elective ____ Year _____
- d. Minor concentration in fraud ____ Year of degree _____
- e. Fraud/forensic certificate ____ Year of degree _____
- f. Master's degree in fraud/forensic field ____ Year of degree _____

15. Please indicate whether a fraud/forensic class was an option when you were in college.

Yes _____ No _____ Unsure _____

16. Approximately how many hours of formal training (e.g., CPE) have you had on the following topics?

- a. Audit risk assessment: In last year _____ hours In last 3 years _____ hours
- b. Audit planning: In last year _____ hours In last 3 years _____ hours
- c. Other audit training: In last year _____ hours In last 3 years _____ hours

- d. Fraud risk assessment: In last year _____ hours In last 3 years _____ hours
e. Fraud audit planning: In last year _____ hours In last 3 years _____ hours
f. Other fraud training: In last year _____ hours In last 3 years _____ hours

17. Within the last year approximately how often do you read professional articles, magazines, and/or books on the following topics?

	Never	1-2x/Year	Quarterly	Monthly	Weekly
Audit risk assessment	0	1	2	3	4
Audit planning	0	1	2	3	4
Other audit related areas	0	1	2	3	4
Fraud risk assessment	0	1	2	3	4
Fraud planning	0	1	2	3	4
Other fraud related areas	0	1	2	3	4

18. On average over the last 3 years, what percentage (%) of your billable time was spent performing the following activities?

Area	Percentage
Revenue Recognition and Accounts Receivable	
Intentional Material Misstatements	
Misappropriation of Assets	
Restatements	
Total Percentage (%)	
Note: Total should not need exceed 100%	

19. Please allocate the **percentage (%)** of the estimated time you billed to **Revenue Recognition and/or Accounts Receivable** in the last 3 years to the following tasks. (**Note:** Total should not exceed the percentage listed in number 18 above.)

Revenue Recognition and Accounts Receivable	Percentage
1. Performing test work related to revenues and accounts receivable while on engagements	
2. Reviewing the test work of others related to revenues and accounts receivable while on engagements	
3. Developing audit program procedures related to revenues and accounts receivable while on engagements	
4. Reviewing the audit program related to revenues and accounts receivable while on engagements	
5. Responding to peers' and/or subordinates' requests for assistance regarding revenues and accounts receivable audit program development	
Total Percentage (%)	
Note: Total does not need to equal 100%	

19. (Continued) Please allocate the **percentage (%)** of the estimated time you billed to **Intentional Material Misstatements, Misappropriation of Assets, and Restatements** in the last 3 years to the following tasks. (**Note:** Total should not exceed the percentage listed in number 18 above.)

Intentional Material Misstatements	Percentage
1. Detecting potential intentional material misstatements while on engagements	
2. Performing test work related to potential intentional material misstatements while on engagements	
3. Reviewing the test work of others related to potential intentional material misstatements while on engagements	
4. Developing audit program procedures related to specific alleged fraud schemes while on engagements	
5. Advising others regarding potential intentional material misstatement red flags and client fraud risk	
6. Advising others regarding audit program development related to specific alleged fraud schemes	
Total Percentage (%)	
Note: Total does not need to equal 100%	

Misappropriation of Assets	Percentage
1. Performing test work related to potential material misappropriation of assets while on engagements	
2. Managing the work of others with regards to potential material misappropriation of assets while on engagements	
Total Percentage (%)	
Note: Total does not need to equal 100%	

Restatements	Percentage
1. Performing test work on engagements related to the restatement of prior year financial statements	
2. Managing the work of others with regards to the restatement of prior year financial statements	
Total Percentage (%)	
Note: Total does not need to equal 100%	

Please continue and complete the final (brief) section of the study.