

A Review and Model of Auditor Judgments in Fraud-Related Planning Tasks

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SUMMARY: In this paper, I develop a model that describes auditor and fraud risk factor characteristics that I expect to affect auditor performance in fraud-related planning tasks (i.e., fraud hypothesis generation, risk assessment, and audit program modification). I expect that auditor knowledge, especially fraud knowledge, will significantly affect auditor performance in audit program modification tasks through its effects on fraud risk factor identification and hypothesis generation. Further, due to fraud's rarity, I expect that this knowledge is acquired primarily through indirect experience such as training rather than from direct experience and is enhanced when auditors have better problem solving skills and higher epistemic motivation. This is a significant departure from knowledge acquisition in other audit settings, and there is currently no evidence in the literature examining these relationships. I also propose that the diagnosticity of fraud risk factors and, specifically, the degree to which they support generation of specific testable fraud hypotheses affect auditors' ability to plan effective changes to audit programs. Finally, I review and summarize the extant fraud-related, audit planning literature and identify opportunities for future research.

Keywords: fraud; risk assessment; hypothesis generation; audit planning.

JEL Classifications: M40; M41; M42.

INTRODUCTION

Detection of financial reporting fraud is difficult for financial statement auditors and continues to be an important concern for the profession. Financial reporting fraud occurs when management intentionally misleads users of financial statements by manipulating the financial statements in a way that is outside the constraints imposed by generally accepted

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I am grateful for comments received from Ann Backof, Michael Bamber, Gia Chevis, Bill Felix, John Fogarty, Jeremy Griffin, Emily Griffith, Kathy Hurtt, Kathryn Kadous, Steve Kaplan, Bill Kinney, Tamara Lambert, Bill Messier, Pam Murphy, Jane Thayer, and especially Ken Trotman and Arnie Wright, as well as workshop participants at Baylor University, and participants at the 2010 AAA Annual Meeting, 2010 Kansas Audit Symposium, and the 2009 Queen's University Advancing Fraud Research Conference. Funding for this research project was provided by the Center for Audit Quality. However, the views expressed in this article and its contents are those of the author alone and not those of the Center for Audit Quality. Finally, I am grateful for support from a Terry-Sanford Research Award.

Editor's note: Accepted by Ken Trotman.

Submitted: Commissioned
Accepted: June 2011
Published Online: November 2011

accounting principles.¹ The CEOs of the largest audit firms acknowledge the importance of auditor detection of fraud (DiPiazza et al. 2006), and industry critics question the value of audits lacking a focus on fraud detection (Johnson 2010). A recent study of frauds investigated by the Securities and Exchange Commission (SEC) reports that the median size of misstatements studied nearly tripled compared with frauds examined a decade earlier and misstatements due to fraud were substantial; the total misstatement for the 300 cases examined was \$120 billion (Beasley et al. 2010). DiPiazza et al. (2006) relate the failure to detect fraud to litigation risk, and the Center for Audit Quality (CAQ 2008) reports that total litigation and practice protection costs have almost doubled since 1999 resulting in the six largest accounting firms spending 15.1 percent of audit-related revenue on these expenses in 2007. Consequently, fraud detection is of great concern to the sustainability of the auditing profession (Advisory Committee on the Auditing Profession 2008).

The Public Company Accounting Oversight Board (PCAOB) continues to stress auditors' responsibility for identifying high fraud risk situations and responding to those situations with appropriate changes to planned procedures (PCAOB 2008). However, PCAOB inspectors report that auditors sometimes fail to change planned audit testing in response to identified fraud risk factors (PCAOB 2007), and academics also report concern about whether auditors appropriately tailor audit programs in response to fraud cues (Asare and Wright 2004; Hammersley et al. 2011; Hoffman and Zimbelman 2009). Examining the efficacy of auditor planning efforts is important not only because they establish the audit program, but also because recent research shows that planning efforts affect how auditors later evaluate evidence (Hammersley et al. 2010).

The purpose of this paper is to develop a model that describes the factors expected to affect auditors' perceptions of fraud risk and the resulting responses to this risk during audit planning. A model specific to fraud planning tasks is necessary to explicate the relationships between characteristics of the auditor and characteristics of the audit setting that are unique to or used in a unique manner in the fraud setting. In describing the model, I summarize and integrate the findings of the growing literature on financial statement auditors' fraud-related, planning stage judgments (hereafter, fraud judgments). I link auditor and fraud risk factor characteristics to fraud hypothesis generation, preliminary fraud risk assessment, and planned audit program modifications. I expect that these characteristics are important determinants of the effectiveness of fraud judgments; however, these antecedents to performance are largely unexamined in the fraud literature. As a result, we know little about how these characteristics affect auditor performance on fraud tasks.

I expect auditor characteristics such as fraud-related experience, problem solving ability, and epistemic motivation² to influence auditors' knowledge available for fraud tasks, just as general knowledge and problem solving ability have been hypothesized to affect knowledge acquisition in the financial statement error identification literature (Bonner and Lewis 1991; Libby 1995). However, given the relative dearth of fraud experience, it is unlikely auditors will acquire fraud knowledge from direct experience. Instead, I expect auditors' indirect experience (e.g., training) plus their problem solving ability and epistemic motivation will play significantly larger roles in knowledge acquisition and subsequent fraud task performance than in non-fraud tasks. The effects of these antecedents to knowledge have not been examined to date in the fraud literature, and specific explication of whether and how auditors acquire the knowledge necessary for superior performance in fraud tasks will advance our understanding of this process.

¹ In this paper, I focus on detection of financial reporting fraud rather than asset defalcation. Financial reporting fraud is of primary concern to financial statement auditors because, while it occurs infrequently, it is extremely costly (Association of Certified Fraud Examiners 2010). For ease of exposition, I will use the label "fraud" to refer to financial reporting fraud throughout the paper.

² Epistemic motivation is the extent to which people develop rich and accurate understandings of situations (Kruglanski 1989).

Likewise, I expect fraud risk factor characteristics to affect auditor performance in risk factor identification, hypothesis generation, risk assessment, and audit program modification. I contribute to the extant literature by identifying the conditions under which auditors should be expected to effectively change planned procedures based on the presence of risk factors. The maintained assumption in much research is that changes to the *nature* of planned procedures are required when any fraud risk factors are identified. However, research has documented that often auditors instead plan increases in the *extent* of testing.

I expect that fraud risk factors (i.e., high-level red flags or specific situational cues) that help auditors generate better hypotheses about how management may be committing fraud will ultimately lead to more effective audit program changes.³ I argue that when high-level red flags (i.e., general incentives, opportunities, or the ability to rationalize fraud) signal only general concern about fraud during audit planning, auditors cannot generate specific fraud hypotheses, so increasing the *extent* of testing is a reasonable response. In contrast, when specific situational cues (i.e., client-specific information about activities or transactions) signal possible fraud, auditors can more easily develop precise hypotheses about how management might be committing fraud, and, as a consequence, specify changes to the nature of their planned procedures. Delineating the conditions that require changing the extent versus the nature of planned tests aids future researchers in designing appropriate test instruments and in forming expectations. Identification of these conditions also allows researchers and audit firms to better identify conditions under which auditor performance on procedure modification is worthy of concern and may call for further training, research attention, or other support.

Auditors' responses to fraud risk factors and fraud risk assessment have received considerable attention in the auditing literature over the past decade. In this paper, I review, summarize, and integrate the research on auditors' planning stage fraud judgments. By carefully examining the state of the literature, I identify areas that have been overlooked or underexamined. To date, research has not examined the antecedents to effective performance in fraud tasks. The model I develop in this paper helps refine our expectations about the conditions that affect auditors' responses to fraud risk factors and how these conditions affect performance. I also point out some areas in which future research could enhance our understanding of how, why, and under what conditions auditors have trouble responding to risk indicators. Improving our understanding of the conditions that affect performance will aid audit firms when making work assignments and when designing training and support systems. This understanding will also aid regulators focused on audit firms' abilities to detect fraud to determine areas in which new or revised standards could improve auditor decision making related to risk.

Ultimately, the goal of this paper is to help improve auditors' capability to identify conditions that signal that fraud may be present and to plan appropriate tests when confronted with these conditions. By carefully examining auditor characteristics that influence fraud hypothesis generation, risk assessment, and response, I explore factors over which auditing firms have significant influence. These factors include choices about which characteristics to focus on in the hiring process and how to train and support auditors in the field in a way that will improve performance on this important task. This research focuses on identifying the knowledge necessary to successfully identify risk factors and modify audit programs and how that knowledge is obtained. This should aid audit firms interested in improving fraud planning performance by allowing firms to match auditor responsibilities with auditors who have the requisite knowledge and ability to successfully perform the task. Firms will also be able to identify topics for auditor training and to

³ I use the term "effective" to refer to procedures that will produce evidence that can discriminate whether fraud is present.

determine an appropriate schedule for that training to assure that auditors responsible for fraud planning tasks have received the training that will aid their success.

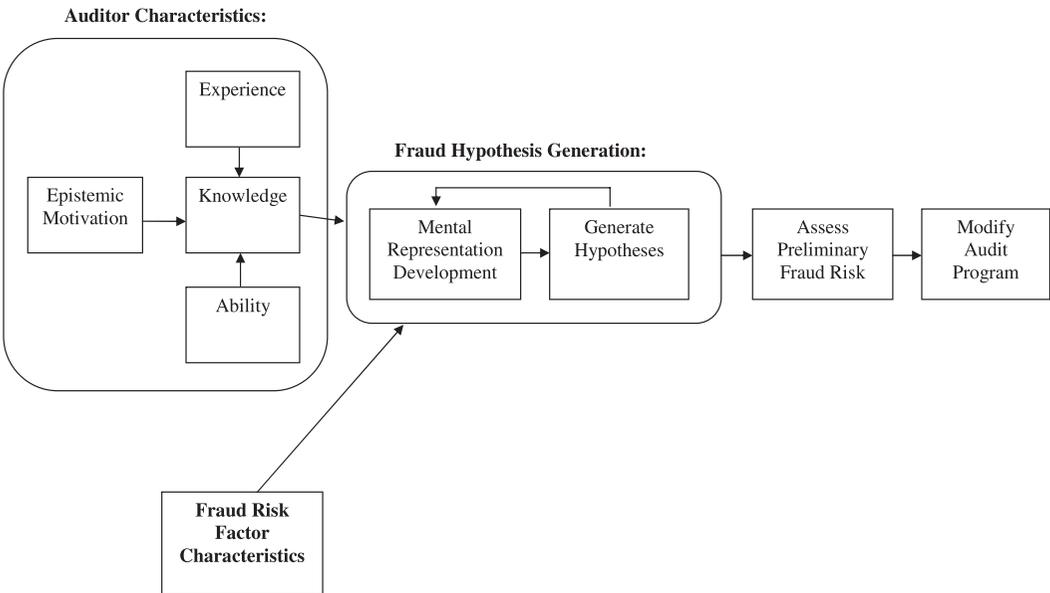
THE MODEL AND LITERATURE REVIEW

The model presented in Figure 1 is adapted from Libby’s (1995) model of the antecedents to knowledge and performance in general audit tasks and Koonce’s (1993) analysis of analytical procedures tasks. A model specific to fraud planning tasks is necessary to explicate the relationships between characteristics of the auditor and characteristics of the audit setting that are unique to or used in a unique manner in the fraud setting. The model describes the factors that affect identification of risk factors and links risk factor identification to fraud risk assessment and determination of necessary changes in standard audit programs. A basic premise of the model is that characteristics of both the auditor and the available fraud risk factors will affect auditors’ capability to appropriately assess fraud risk and to modify the audit program in response to identified fraud risk factors. I expect auditors with sufficient knowledge gained from ability, experience, and epistemic motivation to be more likely to detect the presence of fraud risk factors and respond to those risks effectively. Additionally, I expect fraud risk factors that lead to better hypotheses about the way in which fraud may be committed will lead to more effective responses in the planned audit program.

Before discussing the individual elements of the model, it is important to understand the nature of fraud and how its features change knowledge acquisition in this setting. Then I will discuss the individual elements of the model, summarizing the extant research findings related to each model element. Finally, I will offer some overall conclusions.

FIGURE 1

Planning Stage Fraud Risk Assessment and Audit Program Modification Model



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The Nature of Fraud

Research indicates that auditor experience with fraud is relatively rare. [Loebbecke et al. \(1989\)](#) report that audit partners encounter fraud on 1.3 percent of their engagements and that half of partners surveyed had never encountered material fraud on an engagement. More recently, [Gold et al. \(2010\)](#) report that only 58 percent of their participants (Dutch managers and partners) had experienced fraud during their entire careers. [Hoffman and Zimbelman \(2009\)](#) report that only 25 percent of their audit manager participants had been on one or more engagements where fraud was discovered. [Asare and Wright \(2004\)](#) report that their senior and manager auditor participants had been involved with an average of 0.25 audits in the previous five years on which fraud was detected; [Hammersley et al. \(2011\)](#) report that their senior auditor participants had been on 0.25 audits on which fraud was detected. Infrequent experience with fraud provides little opportunity for learning directly from experience. This is significant as it implies that auditors must acquire fraud knowledge indirectly through fraud training. In contrast, auditors develop other types of knowledge through a combination of experience and training.

While individual auditor experience with fraud detection may be rare, when fraud does occur it is often perpetrated in certain accounts. For example, a study of SEC enforcement actions required by the Sarbanes-Oxley Act of 2002 reports that 55.5 percent of the reporting events examined involved revenue reporting fraud ([SEC 2003](#)). Additionally, this study reports that improper timing of revenue recognition and recording fictitious revenue were the most common techniques used, accounting for 161 of 182 instances of improper revenue recognition cited. This corroborates the Treadway Commission's findings that improper revenue recognition constitutes 61 percent of financial statement fraud techniques with recording fictitious revenue and premature revenue recognition the most commonly used techniques ([Beasley et al. 2010](#)).

[Bonner et al. \(1998\)](#) report that audit firms are more likely to be included in litigation when the alleged fraud is of a relatively common type or includes fictitious transactions. The previous discussion implies that while auditors are unlikely to experience fraud, when they do, they are most likely to experience more common frauds. Additionally, audit firms apparently have an incentive to identify these frauds, and, as a result, may be most likely to provide training on how these frauds occur. Consequently, auditors may have better-developed knowledge about more common revenue fraud schemes. The extent of this training and knowledge development remains an open question; however, studies examining auditor performance on revenue frauds note the difficulties auditors have with these tasks ([Asare and Wright 2004](#); [Hammersley et al. 2011](#)). To the extent a fraud is unique or atypical, it will be harder to detect as it will not fit either an auditor's mental representation or long-term memory for fraud. Frauds that are perceived as atypical may also be perceived as less likely ([Trotman et al. 2009](#); [Hammersley et al. 2010](#)).

Auditor Characteristics

Auditor characteristics that are hypothesized to affect auditor knowledge are consequently expected to affect auditor performance in fraud tasks. As the model indicates, I expect experience, ability, and epistemic motivation to influence auditors' knowledge, just as the first two of these characteristics have been hypothesized to affect knowledge acquisition in the financial statement error identification literature ([Bonner and Lewis 1991](#)). I expect that superior epistemic motivation will enhance auditors' knowledge by prompting auditors to understand more thoroughly client situations that will enhance what they learn from each client. Epistemic motivation will affect how likely auditors are to work hard on understanding the evidence and to identify cues that are inconsistent with other evidence that will be especially critical to effective performance in fraud tasks. However, the effects of any of these auditor characteristics have not been examined to date in the fraud literature. Consequently, specific explication of the relative role of sources of knowledge

(i.e., from experience including training, as a consequence of superior problem solving ability, or from epistemic motivation) will highlight their expected influence. The resulting knowledge is expected to affect auditors' performance when identifying fraud risk factors, generating fraud hypotheses, assessing fraud risk, and modifying the planned audit program in response to the risks.

Knowledge

Knowledge is information stored in memory (Libby 1995). Bonner and Lewis (1990) note that different audit tasks require different types of knowledge. They examine general domain, subspecialty, and world knowledge. General domain knowledge is accounting and auditing knowledge that most people gain by working in a domain through instruction and experience. General domain knowledge, such as knowledge of revenue recognition criteria, for example, is necessary for identifying conditions that indicate departures from those criteria. Identifying these departure conditions is an important first step in identifying fraud. Subspecialty knowledge is related to that specific subspecialty of a domain or an industry and is also acquired by instruction and experience but only by the people working in the subspecialty or on the task. Task-specific knowledge is an important determinant of high quality judgment and decision-making performance (Bonner 2008). World knowledge is general business knowledge that is gained through experience and instruction.

I also expect that auditors will need fraud knowledge to be able to identify fraud risk factors and appropriately respond to those risks. Fraud knowledge includes an understanding of the conditions that allow fraud to occur, the way that fraud schemes operate, the cues that (individually or in combination) signal that such a scheme is operating, the frequencies of occurrence of different fraud schemes, the implications of different types of fraud for the financial statements, and the audit tests that are likely to detect the fraud. I expect that this knowledge may be acquired through direct experience with fraud or from instruction about the nature and implications of various fraud schemes. This knowledge may be a subcategory of either general domain knowledge or subspecialty knowledge, depending on the fraud scheme. It is likely that some fraud schemes are unique to certain industries; as such, only auditors specializing in the industry will encounter these directly or indirectly. Other frauds, such as more common revenue frauds (e.g., channel stuffing or bill and hold schemes), are more likely to be encountered by all auditors.

The fraud literature to date has not reported measures of fraud knowledge or other types of knowledge expected to affect performance in fraud tasks. Consequently, we currently know little about the extent of auditors' fraud knowledge development. Measuring fraud knowledge requires specifying the knowledge required to diagnose fraud from the available cues and determining an effective way to measure such knowledge. This might include knowledge of fraud cues, the mechanics of fraud schemes, financial-statement implications, and how audit tests can determine whether fraud is present.

Experience

Experience is an opportunity to gain knowledge; however, having experience does not guarantee that an auditor has acquired knowledge (Davis and Solomon 1989). Auditor experience, which can be general or task-specific, is an opportunity for auditors to gain knowledge about fraud, among other things. General experience typically is measured as longevity as an auditor. Task-specific experience—industry experience, for example—is typically measured as a recent concentration on a task or the amount of time spent working in a task over a career. Similarly, fraud experience can be measured as direct experience on audits on which financial reporting fraud was discovered or as the amount of indirect experience received from training on fraud topics.

Anecdotally, it appears that being on an audit on which fraud is discovered is positively correlated with total audit experience. However, as with all experience, what is learned from the experience depends on the specific situations encountered during the assignment. Since it appears that fraud experience is sporadic, learning from the experience is likely more difficult than if fraud discovery were more repetitive and frequent. Because field experience with fraud has high variance among auditors and individual auditors' experience is idiosyncratic, general measures of audit experience are likely to be noisy proxies for fraud experience as they do not capture whether auditors have experience with the fraud under investigation. Consequently, measuring experience with financial reporting fraud engagements may be more useful than audit experience for explaining effectiveness of performance on fraud planning tasks.⁴

I expect that fraud training, rather than field experience, is the primary way in which auditors enrich their fraud knowledge. However, little is currently known about the content or timing of fraud training that financial statement auditors receive either at work or during their university educations. For example, research examining whether and how there is a later benefit to financial statement auditors who take forensic accounting coursework could be informative. Given that forensic training and work focuses on investigation and quantification of fraud after fraud has been identified (Wells 2004), it is unclear whether training in this area would aid financial statement auditors working on planning tasks who focus on determining whether the financial statements conform to generally accepted accounting principles. Overall, research about fraud education and training would enhance our understanding of what is being done, and this may allow audit firms and accounting educators to evaluate the effectiveness of the content and timing of current practices. Additionally, data regarding fraud education and training would enhance researchers' ability to target tasks at appropriate participant groups and help explain performance in audit research studies.

Problem Solving Ability

I also expect problem solving ability to play an important role in the development of auditors' fraud knowledge. Bonner and Lewis (1990) define problem solving ability as the ability to recognize relationships, interpret data, and reason analytically. Libby and Tan (1994) report that problem solving ability affects knowledge acquisition and directly affects performance in unstructured tasks and in impoverished learning environments. Unstructured tasks require problem definition, generation of alternatives, search for information, completion of complex calculations, and forward and backward reasoning. Identifying and responding to fraud risk factors are unstructured tasks; they require auditors to be able to recognize patterns in data that indicate unexpected relationships, generate fraud hypotheses, reason analytically about the implications of the hypotheses for the financial statements, and finally to link those implications to effective audit tests that will reveal whether the hypothesized fraud is present. Learning environments are more impoverished when the required knowledge is complex and/or instruction and professional guidance do not make the information available in a structured form (Libby and Tan 1994), consistent with the conditions present in fraud tasks. Since fraud is a relatively rare event, fraud schemes are generally complex, and little guidance exists to aid auditor judgment, it appears that fraud tasks are both unstructured and occur in impoverished learning environments.

Consequently, while Bonner and Lewis (1990) note that problem solving ability is not necessary for superior performance in all tasks, problem solving ability appears necessary for

⁴ Note that studies reporting participant pool fraud experience statistics generally measure experience with fraud, but do not specifically ask participants about their experience with financial reporting fraud (e.g., Asare and Wright 2004; Hammersley et al. 2011). Consequently, we know little about the types of fraud auditors experienced and whether that experience is relevant to the frauds examined in research.

knowledge acquisition and superior performance in fraud planning tasks. Additionally, since auditor fraud experience is sporadic, auditors will be less able to rely on fraud knowledge obtained from prior fraud experiences. Instead, their success may require substituting superior problem solving skills for retrieving some relevant knowledge from memory to identify fraud risk factors and their implications. Thus, problem solving ability is likely to be especially important in explaining auditor performance in fraud tasks. However, I know of no research that examines the effect of problem solving ability on fraud tasks. In addition to examining whether problem solving ability explains superior performance, such work could examine whether problem solving ability differs across ranks in firms (i.e., do managers who have self-selected to stay in public accounting have superior problem solving ability relative to newly hired staff?). This evidence would be useful to audit firms interested in identifying and retaining their current and future best performers.

Epistemic Motivation

Epistemic motivation is the extent to which people develop rich and accurate understandings of situations (Kruglanski 1989). I expect that better understanding of a client's systems, business, and risks aids auditor performance in fraud planning tasks. Epistemic motivation may vary as a function of situational pressures such as time pressure, fatigue, and accountability; however, epistemic motivation is also a function of stable individual differences (De Dreu and Carnevale 2003). Epistemic motivation affects hypothesis generation and validation (Kruglanski 1990) and affects the quality of decisions made because it stimulates systematic information processing (Scholten et al. 2007).

Several individual difference measures of epistemic motivation are known to predict how people use information and sometimes lead to differences in decision performance. For brevity, I will discuss only three of these below, although other measures are also likely to be relevant to performance in fraud planning tasks. First, the need for cognition measures the extent to which people engage in and enjoy effortful thinking (Cacioppo and Petty 1982). This need affects how people use information and make decisions. People with a greater need for cognition are more likely to consider all the relevant information, discriminate strong-versus-weak arguments, discriminate diagnostic-versus-non-diagnostic information, and evaluate their thoughts for validity (Petty et al. 2009). Second, the need for cognitive closure measures how quickly people tend to stop epistemic processes and allow judgments to form (Kruglanski and Fishman 2009). People with a lower need for closure generate more hypotheses before reaching judgments and are more aware of alternatives and, therefore, less confident in their decisions than those with a higher need for closure. Finally, in accounting, increasing professional skepticism has been suggested as a means of improving auditor performance. Hurtt (2010) defines skepticism as a stable trait having six dimensions reflecting the degree to which people search for knowledge, suspend judgment, are self-determining, have interpersonal understanding, are self-confident, and have a questioning mind. Nelson (2009) discusses state skepticism, which posits that external factors likely also affect how skeptically people behave. We currently know little about how auditors' levels of trait or state skepticism affect how they process information or make decisions and how these measures interact with other environmental variables in fraud planning tasks.

Overall, I expect epistemic motivation and associated individual difference measures to be important drivers of performance in unstructured, complex, fraud planning tasks, but these measures are largely unexamined in the auditing literature. While the effects of external factors such as situational pressures on auditor performance have been shown in accounting (see Nelson [2009] for a review), we currently know little about how variability in internal factors, such as epistemic motivation, affects auditor knowledge acquisition and performance in fraud tasks or how these factors interact with auditor knowledge acquisition. A better understanding of the influence of these internal factors would aid audit firms in hiring and retention decisions, designing incentives to spur performance, and identifying which aspects of decision making could be better supported in the field.

Fraud Risk Factor Characteristics

Fraud risk factors are cues that signal the existence of conditions that increase the chance fraud is present. These risk factors may be general or specific in nature. General risk factors include red flags such as general incentives, opportunities, or the ability to rationalize fraud (AICPA 2002). Specific risk factors include situational cues that provide client-specific information that changes the perception that fraud may be present. While it is not possible to determine whether fraud is *actually* present during audit planning, auditors must plan an appropriate response to the identification of fraud risk factors that signal that fraud *may be* present.⁵ As Bell et al. (2005) note, different types of audit evidence vary in their usefulness for fraud detection. I expect that auditors' capability to respond effectively to risk factors depends on the risk factors' characteristics.

General red flags (e.g., the presence of undue emphasis on meeting earnings targets), which previous research has shown are present when fraud is present (Bell and Carcello 2000), suggest that conditions may be right for fraud to exist. However, red flags, by themselves, generally do not provide any information about *how* fraud possibly is being committed. Indeed, the risk factors that audit firms' practice aids, including red flags checklists, include do not (and indeed, cannot) focus on risks that give rise to specific "how" hypotheses (Shelton et al. 2001). Decision aids developed by audit researchers also, by design, focus on general red flags (e.g., Hansen et al. 1996; Eining et al. 1997; Bell and Carcello 2000) that cannot enhance generation of specific hypotheses. Consequently, I do not expect that identifying red flags, by themselves, will aid audit performance in fraud planning tasks.

Specific situational cues, which signal the possibility of fraud (e.g., a new marketing program was instituted at the end of the year that changed contract terms for a subset of the company's clients, and revenue recognition may be fraudulently overstated as a result), provide information about how fraud possibly is being committed, enhance auditor understanding, and allow auditors to develop specific testable hypotheses about fraud. Additionally, these cues in combination with a red flag may indicate both how clients could commit fraud and that they have increased pressures, opportunities, or the ability to rationalize fraud. The presence of a specific hypothesis enhances auditors' ability to plan changes to audit procedures that will be effective in detecting fraud. Future research should be clear about what expectations auditors can form, based on the type of fraud risk factors present. This will aid researchers' hypothesis development about expected auditor response to the presence of fraud risk factors and evaluation of auditor performance.

Fraud Hypothesis Generation

I expect fraud hypothesis generation to be an iterative process that begins with recognition of an initial set of fraud risk factors that signal conditions that may allow fraud to occur and culminates in specific hypotheses about how fraud may be occurring. The extent of auditors' knowledge, the type of risk factors present, and the extent of the auditor's mental representation development affect the initial identification of risk factors. Auditors with more knowledge relevant to the available

⁵ Some studies have examined whether auditors are sensitive to the presence of fraud, as opposed to the presence of fraud risk factors, during audit planning by providing fraudulent and restated financial statements (e.g., Knapp and Knapp 2001; Carpenter 2007). When fraud is committed strategically, as Wilks and Zimbelman (2004a) suggest is often the case, it is likely that fraud will be difficult to detect from financial statements alone. If the background information in fraud studies is held constant, then it seems that auditors should respond to the fraud risk factors that are present, even in no-fraud experimental conditions. While identification of fraud is the ultimate goal of fraud planning, diagnosis of fraud is not feasible until evidence has been examined. In audit planning studies, regardless of the fact that fraud is not actually present, auditors must still plan audit tests that will allow evaluation stage auditors to determine whether fraud exists after seeing the results of planned tests. Consequently, studies of auditor calibration with respect to fraud, while important, may be better left to studies of evidence evaluation.

fraud risk factors will be more likely to recognize the importance of these risk factors and to develop more complete mental representations initially. The initially identified fraud risk factors will then be added to the auditor's mental representation for the client, potentially adding critical pieces of a pattern of cues that allows identification of other risk factors that might be present. This process of risk factor identification, mental representation updating, and fraud hypothesis generation is expected to continue until the auditor decides all of the important fraud hypotheses have been generated. I discuss further the effects of mental representations on fraud risk factor identification in the next section.

Mental Representations

Mental representations are cognitive models of a domain or situation that are used to run mental simulations and allow decision makers to form inferences (Christ 1993; Greeno 1989).⁶ Mental representations are created at the time of use, based on the information stored in memory and the features of the problem under consideration (Markman and Gentner 2001). Mental representations are better developed when decision makers have more experience and knowledge in the domain under investigation (Chi et al. 1981; Christ 1993; Hammersley 2006). Consequently, I expect auditors with more fraud knowledge to create better-developed mental representations for fraud.

Having a mental representation focused on the important problem features affects whether the relevant information is considered when solving a problem (Vera-Munoz et al. 2001) and, therefore, is critical to successfully completing a task (Bierstaker et al. 1999). People base their judgments on the mental representations they build rather than on the original facts related to a problem (Hammersley et al. 1997). Thus, the representation affects the interpretation of evidence and direction of search for further evidence (Koehler 1991). For example, having a well-developed mental representation allows auditors to make inferences that incomplete cue patterns indicate misstatement (Hammersley 2006).

Consequently, I expect auditors with better-developed mental representations will recognize the significance of fraud risk factors and understand how they interact to form a pattern indicating possible misstatement. I expect this will be easier when the available risk factors enhance the auditors' ability to form hypotheses about how fraud could be occurring (i.e., the risk factors are specific situational cues). Additionally, auditors with better-developed mental representations are expected to be better able to run simulations or thought experiments about how the financial statements could be affected if a particular type of misstatement or fraud is present. I expect that auditors will refine their mental representations to include the presence of significant risk factors and that this iterative updating will continue throughout the planning stage of the audit.

The preceding discussion makes salient the factors that I expect affect auditor mental representation development. However, it is an open question as to how well developed auditors' actual mental representations are for fraud. It would be useful to examine how well developed auditors' fraud mental representations are relative to their error representations. While the previous discussion documents that auditors could develop relatively complete mental representations for fraud based on knowledge acquired through experience and training, we do not know whether they

⁶ The psychology literature has investigated many types of mental representations, including mental models (Johnson-Laird 1983; Gentner and Stevens 1983), scripts and schemas (Shank and Abelson 1977), and theories (Murphy and Medin 1985), among others. The accounting literature generally has not attempted to differentiate among these different types of mental representations. Instead, the accounting literature has focused on factors that affect the extent of mental representation development or the implications of having better or worse developed mental representations for decision making in accounting domains. The goal in examining mental representations has been to describe or predict how they combine with the unique features or combinations of features of the accounting setting to affect decision-making quality in that setting.

get enough fraud experience and training to achieve representations that are actually developed well enough to aid subsequent performance. To my knowledge, there is no research that examines the extent of auditors' mental representations for fraud situations, the relative effects of fraud experience, fraud training, problem solving ability, or epistemic motivation on mental representation development, or whether the extent of mental representation development affects risk factor identification, risk assessment, or audit program modifications.

Hypothesis Generation Process

Hypothesis generation is the process of thinking of causes or explanations for a given set of cues (Bonner 2008). During audit planning, hypothesis generation is used to identify plausible explanations for how fraud could be occurring based on the identification of fraud risk factors signaling conditions exist that may allow fraud to occur. Hypothesis generation can be performed individually or in a group, but recent auditing standards have mandated formal group hypothesis generation during audit planning in a brainstorming session (AICPA 2002).

In the preceding discussion about mental representations, I noted that knowledge and mental representation development will affect auditors' ability to recognize the importance of fraud risk factors. I further expect that these characteristics will aid fraud hypothesis generation. Additionally, I expect that auditors with better problem solving ability and higher epistemic motivation will be more able to generate hypotheses about how a risk factor could result in fraud. Finally, I expect that specific situational cues or combinations of these cues with red flags will aid hypothesis generation by suggesting more specific ways in which fraud could be occurring. In turn, auditors with better knowledge, problem solving ability, and epistemic motivation should be better able to evaluate the plausibility of the hypotheses generated. The fraud hypotheses evaluated as plausible will be retained, documented in the fraud risk memo, and used to assess fraud risk. Additionally, auditors will use these plausible hypotheses to iteratively refine the client mental representation, which may lead them to identify additional risk factors and generate additional fraud hypotheses. Finally, I expect hypothesis generation to provide the critical link between the identification of fraud risk factors and speculation about how fraud possibly is being committed that is necessary for auditors to develop an appropriate response to the fraud risk factor.

To date, I know of no research that examines the impact of auditor knowledge or mental representation development on fraud hypothesis generation, evaluation, or response. It would be interesting to investigate whether auditors with better fraud mental representations generate more plausible fraud hypotheses or are more likely to generate a seeded fraud. Ultimately, it would be useful to examine whether or how differences in fraud hypothesis generation lead to effective changes to planned audit programs. I summarize the extant fraud hypothesis generation studies in Table 1 and describe them in more detail in the next several paragraphs.

SAS 99 now requires formal group hypothesis generation in the audit's planning stage during a "brainstorming" session about how and where the audit team believes the client's financial statements might be susceptible to fraud and how management could commit fraud (AICPA 2002).⁷

⁷ The psychology literature defines brainstorming as interacting group hypothesis generation using the following guidelines: "[K]eep in mind that the more ideas the better and the wilder the ideas the better; improve or combine ideas already suggested; and do not be critical" (Diehl and Stroebe 1987, 497). SAS 99 does not contain this guidance, and this may explain why many of the auditing "brainstorming" studies do not use this guidance. Consequently, many of the auditing brainstorming studies would be considered interacting group hypothesis generation studies in the psychology literature, rather than brainstorming studies. This is especially important to keep in mind when comparing predictions and inferences between the auditing and the psychology literatures. In this paper, I will use the term "interacting group" when studies have not used the traditional brainstorming guidance.

TABLE 1
Summary of Fraud Hypothesis Generation Studies

Study	Case Used Allows Specific Fraud Hypothesis Generation?	Study Manipulates Presence of Fraud or Risk Factors?	Participants Brainstorm?	Summary of Results
Eiming et al. (1997)	No	Yes	No	Participants who use an expert system decision aid discriminate the presence of fraud risk factors better than those using a LOGIT model, a checklist, or working unaided.
Mock and Turner (2005)	NA	NA	No	Auditors document more fraud risk factors in working papers on clients assessed as having higher client risk than those assessed as having lower client risk.
Carpenter (2007)	Yes	Yes	Yes	Nominal groups generate more unique hypotheses than face-to-face interacting groups; the presence or absence of fraud does not significantly affect the number of ideas for either group.
Trotman et al. (2009)	Yes	No	Yes	Interacting groups who receive brainstorming or pre-mortem instructions generate more misstatement, expert-identified misstatement, and expert-identified fraud hypotheses than unguided interacting groups.
Lynch et al. (2009)	Yes	No	Yes	Nominal electronic and interacting electronic groups identify more fraud risk factors than do face-to-face interacting groups.
Hunton and Gold (2010)	Yes	No	Yes	Round robin and nominal groups generate more unique fraud hypotheses than do face-to-face groups.
Hammersley et al. (2011)	Yes	No	No	The number of fraud risk factors focused on the seeded fraud does not differ based on awareness of fraud risk.

NA indicates the study was conducted by examining judgments documented in client working papers.

Several recent studies examine the effect of different approaches to this brainstorming session on fraud hypothesis generation, fraud risk assessment, and/or planned audit program modifications. The auditing group hypothesis generation literature uses problems related to the auditors' expertise and often uses hierarchical teams; these features are important elements of the auditing context, and their presence in auditing research designs distinguishes this work from that done in psychology. Despite these critical contextual differences, auditing studies that examine differences between nominal groups (i.e., individuals who generate hypotheses alone and whose work is mechanically combined *ex post*) and face-to-face interacting groups largely replicate the psychology findings. That is, nominal groups generate more unique fraud hypotheses than face-to-face interacting groups with no brainstorming guidance (Carpenter 2007; Hunton and Gold 2010); however, Carpenter (2007) reports that face-to-face interacting groups generate more quality fraud hypotheses than nominal groups. Overall, face-to-face interaction does not appear to increase the number of unique fraud hypotheses that the same number of individual auditors could generate on their own; indeed, face-to-face interaction appears to reduce the number of hypotheses identified.

Several recent studies have examined whether different instructions for face-to-face interaction affect the number of hypotheses that interacting teams identify. Hunton and Gold (2010) randomly assigned 150 teams of auditors to generate hypotheses on real clients using round robin discussion (i.e., each member generates hypotheses individually and then must present all of their ideas to the group in two rounds), nominal group procedures, or face-to-face open discussion without individual hypothesis generation or other guidance. Hunton and Gold (2010) report that their round robin and nominal groups list more unique fraud hypotheses than face-to-face open discussion groups. Given that these groups also plan larger average increases in planned audit hours and are more likely to change the nature and timing of substantive tests based on the results of the hypothesis generation session, it seems that the audit teams believed that the additional hypotheses were plausible enough to require addressing. Trotman et al. (2009) compare three types of face-to-face interacting groups' performance: no guidance (i.e., conditions similar to Carpenter's interacting group and Hunton and Gold's face-to-face discussion group), brainstorming guidance (i.e., avoid criticism of ideas, encourage unusual idea generation, change others' ideas to improve them, and emphasize quantity of ideas generated), and premortem guidance using backward reasoning (i.e., imagine it is now the future and fraud has been discovered; list as many ideas about how this could have happened as possible). Trotman et al. (2009) report that the brainstorming and premortem interacting groups list more misstatement hypotheses, fraud hypotheses, and expert identified fraud hypotheses than do the no guidance interacting groups. This paper provides the only evidence in the literature of the impact of using traditional brainstorming guidance. Finally, Lynch et al. (2009) compare students' performance identifying fraud risk factors in interacting electronic groups (i.e., participants use an electronic system to share their ideas and receive the ideas of other group members in real time) with nominal electronic and face-to-face interacting groups. Lynch et al. (2009) report that interacting electronic and nominal electronic groups identify more fraud risk factors than do face-to-face interacting groups; however, the student participants did not generate fraud hypotheses.

Overall, it appears that using traditional brainstorming, premortem, or round robin guidance increases the number and quality of fraud hypotheses the audit team generates compared to unstructured face-to-face discussion. However, Bellovary and Johnstone (2007) and Brazel et al. (2010) report that brainstorming sessions generally are conducted using unstructured face-to-face interaction. Consequently, it appears that there is an opportunity to increase the benefits from the brainstorming meeting based on the results of this stream of research. In fact, Hunton and Gold (2010) report that their participating firm plans to adopt the round robin method of brainstorming on its engagements.

Future research could examine what types of instructions and under what conditions those instructions improve performance during the brainstorming session. Additionally, future research could investigate who the brainstorming group's best member is and whether instructions about how to conduct the brainstorming session improve performance over that of the best member working alone. If the best member is consistently a manager or partner, then this may call into question the efficiency and effectiveness of the brainstorming session for fraud risk identification and hypothesis generation purposes, although there may also be training benefits from brainstorming. Research examining the efficiency and effectiveness of the brainstorming process should be of interest to regulators who evaluate the efficacy of audit practices and can mandate changes to auditing requirements.

Since risk factor identification and fraud hypothesis generation are expected to affect fraud risk assessments and subsequent changes to audit plans, improvements to the brainstorming process are important. Indeed, [Mock and Turner \(2005\)](#) report that auditors documented more fraud risks in the working papers of clients on which fraud risk was assessed higher. Additionally, [Hammersley et al. \(2011\)](#) report that auditors who list more fraud risk factors that are related to a seeded fraud also recommend more effective modifications to a standard audit program, suggesting that fraud risk factor identification is an important determinant of success in audit program modification. However, it is noteworthy that few studies to date have examined how performance on one of these tasks affects performance in subsequent tasks. For example, while several studies examine both fraud risk factor identification and fraud risk assessment, they do not examine how performance on risk factor identification affects subsequent risk assessment. Likewise, there is little evidence about whether or how performance on either of these tasks affects the effectiveness of subsequent audit program changes; to date, relationships among these tasks have been assumed but remain largely unexamined.⁸ Systematic evaluation of these relationships in combination with examination of the antecedents to performance would enhance our understanding of factors that affect auditor performance in these critical tasks.

Fraud Risk Assessment

Auditors make a preliminary overall fraud risk assessment during planning based on fraud risk factors identified and fraud hypotheses generated. This risk assessment is updated after completing evidence evaluation based on test results. The preliminary risk assessment guides auditor decisions about whether changes to the audit program are necessary. Thus, this assessment is an important determinant of audit effectiveness. One reason auditors fail to modify planned procedures appropriately may be that they do not recognize the presence of increased risk. However, increasing fraud risk assessments in response to hypothesized fraud does not necessarily indicate that the auditors know whether or what kind of change to the audit program is necessary. Finally, it is impossible to determine whether fraud is present during audit planning since evidence has not yet been collected. Consequently, what is important is whether auditors are identifying fraud risk factors (i.e., red flags or specific situational cues) and generating plausible hypotheses based on their presence that signal an increased risk of fraud. Evidence of sensitivity to these signals is apparent in fraud risk assessments.

In Table 2 and the following discussion, I summarize the papers that study fraud risk assessment during audit planning; these papers comprise the majority of the extant fraud planning literature. [Bell and Carcello \(2000\)](#) developed a logistic model to predict fraud and

⁸ To my knowledge, only [Asare and Wright \(2004\)](#) and [Hammersley et al. \(2011\)](#) examine whether there is a significant relationship between fraud risk assessments and audit program quality, and neither study finds evidence supporting this relationship.

report that six red flags (of 46 tested) discriminate the presence of fraud and that their model outperforms auditor judgment of fraud risk. [Hackenbrack \(1993\)](#) reports that there is little agreement among auditors about the effect of various red flags on fraud risk. However, [Apostolou et al. \(2001\)](#) report that auditors rank red flags related to management characteristics and influence over the control environment as much more important to the fraud risk assessment than red flags related to operating, financial stability, and industry conditions. Overall, there is little consensus among auditors on the effect of individual red flags on fraud risk. This suggests that, by themselves, these cues have limited diagnosticity for audit planning tasks or that their usefulness depends on their interaction with specific situational cues; to date, there is no evidence of this in the literature.

A number of studies have examined the effect of auditors' focus on fraud risk assessments during planning stage risk identification. [Knapp and Knapp \(2001\)](#) report that when auditors are instructed to focus on the fraud risk assessment they increase their assessments in the fraud condition but not in the no-fraud condition. [Knapp and Knapp \(2001\)](#) also report that managers, but not seniors, assess fraud risk higher when fraud is present than when fraud is absent. [Zimbelman \(1997\)](#) reports that auditors who separately assess fraud and error risks assess fraud risk, but not error risk, higher when red flags are present; auditors who holistically assess total misstatement risk (i.e., a combined fraud and error risk) also assess this risk higher when red flags are present. [Wilks and Zimbelman \(2004b\)](#) investigate whether decomposing red flags into opportunity and incentive cues affects fraud risk assessments. They report that when fraud risk is low, decomposition makes the fraud risk assessment more sensitive to incentive cues, but when fraud risk is high, auditors are equally sensitive to these cues with or without decomposition. [Pincus \(1989\)](#) tests the effectiveness of using a red flags questionnaire on fraud risk assessments when auditors are able to generate a specific fraud hypothesis. She reports that auditors assess fraud risk highest when they do not use the questionnaire that did not include the specific fraud. When auditors have cues that allow identification of a seeded fraud, they rate the seeded fraud as the most likely cause of misstatement from among seven possible causes ([Trotman and Wright 2011](#)). [Asare and Wright \(2004\)](#) use a case that provides the basis for generating specific fraud hypotheses in all conditions. They report that auditors who generate fraud hypotheses unaided assess fraud risk higher than auditors who use a red flags checklist that lacked the specific frauds present. Using a similar case, [Hammersley et al. \(2011\)](#) report that audit seniors assess fraud risk higher when they receive material weakness information that makes fraud cues more salient. Finally, interacting groups assess fraud risk higher than nominal groups or individuals ([Carpenter 2007](#); [Lynch et al. 2009](#)), although [Trotman et al. \(2009\)](#) report no difference in risk assessments among interacting groups despite superior fraud hypothesis generation by the two groups that received discussion guidance.

Overall, auditors are sensitive to cues that increase the salience of fraud or fraud risk ([Zimbelman 1997](#); [Knapp and Knapp 2001](#); [Wilks and Zimbelman 2004b](#); [Hammersley et al. 2011](#); [Trotman and Wright 2011](#)). However, if the fraud risk identification process (e.g., using a fraud risk checklist focused on red flags) distracts auditors from identifying other fraud cues, it appears that this impairs fraud risk assessment ([Pincus 1989](#); [Hackenbrack 1992](#); [Asare and Wright 2004](#)). One way to focus auditors on risks may be to assess fraud risk at the account or assertion level; this may aid auditor performance by more concretely linking risk factors to specific areas. Overall, increased fraud risk assessments in the presence of risk factors are necessary but not sufficient to ensure effective changes to audit programs. Increased fraud risk assessments, while indicating concern about a situation, do not indicate by themselves whether the auditor has an appropriate fraud hypothesis. Additionally, increased risk assessments do not indicate that auditors know how to determine whether their fraud hypothesis is true. For evidence about this question, we must examine proposed program modifications.

TABLE 2
Summary of Fraud Risk Assessment Studies

Study	Case Used Allows Specific Fraud Hypothesis Generation?	Study Manipulates Presence of Fraud or Risk Factors?	Summary of Results
Pincus (1989)	No	Yes	Auditors in the fraud present condition assess fraud risk higher when they do not use a red flags questionnaire than when they do and higher than auditors in the no-fraud condition, regardless of questionnaire use.
Hackenbrack (1993)	No	Yes	Auditors show little agreement about the relative effect on fraud risk of 16 fraud risk factors.
Zimbelman (1997)	No	Yes	Participants who separately assess fraud and error risks assess fraud risk higher when fraud red flags are present; participants who assess a holistic misstatement risk assess this risk higher when red flags are present.
Bell and Carcello (2000)	NA	NA	The authors develop a logistic model to predict the risk of fraud; they find that six of 46 red flags discriminate the presence of fraud. The model outperforms auditor fraud risk assessment.
Knapp and Knapp (2001)	No	Yes	Managers assess fraud risk higher when fraud is present than absent; seniors do not differentiate the presence of fraud.
Apostolou et al. (2001)	No	No	Overall, auditors assess fraud risk higher when instructed that their objective is to assess the risk fraud is present than when not so instructed.
Graham and Bedard (2003)	NA	NA	Auditors rate the importance of 25 red flags. Red flags related to management characteristics and the control environment are rated as more important than operating, financial, and industry red flags. Auditors' number of recalled fraud risks present on a previously audited client is not significantly related to <i>ex post</i> fraud risk assessments.

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TABLE 2 (continued)

Study	Case Used Allows Specific Fraud Hypothesis Generation?	Study Manipulates Presence of Fraud or Risk Factors?	Summary of Results
Asare and Wright (2004)	Yes	No	Participants who use a standard fraud risk checklist organized around SAS 82 red flag categories (i.e., attitudes, opportunities, and incentives) to identify risk factors assess fraud risk lower than participants who list risk factors unaided.
Wilks and Zimbelman (2004b)	No	Yes	Auditors in a low fraud risk condition who anticipate and separately assess opportunity, incentive, and attitude risks prior to assessing fraud risk make fraud risk assessments that are more sensitive to incentive and opportunity risk factors than auditors who do not anticipate or assess decomposed risks; there are no differences in the high fraud risk condition.
Carpenter (2007)	Yes	Yes	Interacting groups assess fraud risk higher than nominal groups.
Lynch et al. (2009)	Yes	No	Fraud risk assessments are higher after interaction (across all methods examined) than before interaction.
Trotman et al. (2009)	Yes	No	Fraud risk assessments do not differ among the three brainstorming groups.
Brazel et al. (2010)	NA	NA	Fraud risk assessments recalled for recent engagements do not differ significantly based on brainstorming session quality score.
Hammersley et al. (2011)	Yes	No	Auditors in the material weakness present condition assess fraud risk higher than auditors in the control condition.
Trotman and Wright (2011)	Yes	Yes	Auditors assessed fraud risk from the seeded fraud highest among the seven options provided. Additionally, auditors' fraud risk assessments were affected by evidence relating to the client's business model only when financial statement and business process performance information were in conflict.

NA indicates that the research method used does not allow categorization on this dimension.

Audit Program Modifications

Auditors make changes to planned audit programs based on fraud risk factors identified, fraud hypotheses generated, and the perception that there is an unacceptable risk of misstatement. However, as [Zimbelman \(1997\)](#) notes, auditors may not plan changes to audit programs if they do not believe changes are necessary or effective to detect fraud, even if they have identified a fraud risk factor. Additionally, whether auditors make effective changes to planned procedures in response to perceptions of increased fraud risk is a joint test of whether the fraud risk factor identified is useful for this purpose, auditors recognize that the procedures should be modified, auditors know which procedures should be modified, and auditors know how to modify the audit procedures appropriately.

The type of procedure change specified will depend on the characteristics of both the auditor and the risk factor. Auditors lacking sufficient fraud and other relevant knowledge will not produce mental representations that aid hypothesis generation. Additionally, auditors lacking knowledge, problem solving ability, or epistemic motivation will be less likely to be able to connect a fraud hypothesis to a financial statement consequence or to specify an effective test that would determine whether the fraud is present.

Alternatively, the fraud risk factors may be too general to yield specific hypotheses about which accounts are affected or how accounts might be misstated that suggest appropriate tests. Risk factors that do not point to specific concerns (i.e., red flags) may result in general fraud hypotheses (i.e., revenue fraud, expense fraud, etc.), but in absence of specific information indicating what or how fraud may be committed, these risks are unlikely to be evaluated as particularly plausible. Fraud risk may be assessed higher after identifying these red flags; however, without a specific fraud hypothesis, it is unlikely the auditor will consider it necessary, or even possible, to test whether any specific fraud is being committed. In this situation, the only planning stage response expected may be increases in the extent of procedures (i.e., increases in planned audit hours and sample sizes) or changes to the composition of the audit team (i.e., use of more experienced auditors or industry-specialist auditors) to ensure vigilance against the non-specific, but serious, risk. If the increase in extent of procedures leads to discovery of more specific risks during testing or evidence evaluation, changes to the nature of specific procedures may be identified at that point.

However, when risk factors are composed of specific situational cues (e.g., a new marketing program was instituted at the end of the year and revenue recognition may be suspect), they allow auditors to develop specific testable hypotheses. These hypotheses are more likely to be deemed plausible enough to require changes in planned audit procedures. Additionally, these hypotheses are detailed enough that they can provide clues that allow auditors with sufficient knowledge, problem solving ability, and epistemic motivation to connect the hypotheses to specific consequences in the financial statements. I expect this would increase the likelihood that auditors specify effective changes to the nature of audit procedures. In this situation, the changes in procedures would likely include targeting a procedure or sample specifically to determine whether the hypothesized fraud is present. Future research should carefully consider the effect of the type of risk factors present on auditors' ability to generate specific fraud hypotheses and what the expectations should be about changes to planned audit procedures.

A number of studies have examined auditors' planned changes to audit procedures; however, most have done so with cases that did not allow auditors to develop specific testable hypotheses (i.e., cases containing only red flags). I will discuss these studies first and then move on to discuss studies that do allow development of specific hypotheses. These studies are summarized in Table 3.

[Zimbelman \(1997\)](#) examines whether separately assessing the risk of fraud will make auditors more sensitive to red flags. He reports that auditors spend more time reading red flags and assign more planned audit hours when required to assess fraud and misstatement risk separately than when

holistically assessing misstatement risk. However, [Zimbelman's \(1997\)](#) measure of change to the nature of planned procedures, perceived audit program strength (i.e., a measure of the standard procedures selected from a list indicating the ones the auditors believe are most important to perform), does not change based on either risk assessment type or the presence of red flags. [Glover et al. \(2003\)](#) do a follow-up study to [Zimbelman \(1997\)](#) in which they examine whether sensitivity to red flags increased after implementation of SAS 82. They report that auditors are more sensitive to the presence of red flags after implementation of SAS 82, as evidenced by a higher perceived need to modify the audit plan to detect fraud and an increase in the total audit hours planned when red flags are present than when they are absent. However, [Glover et al. \(2003\)](#) also report no effect of red flag presence or implementation of SAS 82 on perceived audit program strength (i.e., the same measure as used by [Zimbelman \[1997\]](#)). Overall, it appears that auditors generally believe that more work must be done to respond to increased risk. However, it is premature to conclude, based on this evidence, that auditors do not change the nature of procedures in response to fraud risk factor identification. In these studies, participants could not form specific hypotheses about the type of fraud present from the red flag cues present, impeding the ability to prescribe audit program changes.

[Glover et al. \(2000\)](#) examine how auditors change the extent of testing (i.e., sample sizes and planned audit hours for inventory observation, purchase, and price testing) in response to discovery of a significant, unexpected inventory fluctuation. They report that auditors are more likely to increase the extent of planned tests when management's explanation is not corroborated than when it is. However, they also report that a large proportion of auditors do not plan changes to these tests even though management has an explicit incentive to misstate the financial statements.

More recently, several studies have used cases containing specific situational cues that allow auditors to develop specific fraud hypotheses that can be followed up with changes to planned audit programs. [Asare and Wright \(2004\)](#) report that seniors and managers who modify a standard audit program create less effective fraud detection programs and are less likely to consult with a fraud expert than auditors who do not use standard audit programs (i.e., those who list procedures that should be performed without a decision aid). [Hammersley et al. \(2011\)](#) report that audit seniors respond to increased awareness of fraud risk by increasing planned sample sizes, but seniors do not plan effective modifications to a standard audit program, such as targeting procedures or samples in the fraud area. [Hoffman and Zimbelman \(2009\)](#) report that audit managers who are prompted to brainstorm about audit program changes or use strategic reasoning make more effective audit program modifications than auditors who do not receive these interventions. [Hunton and Gold \(2010\)](#) report a study during which auditors performed group hypothesis generation on actual client engagements, a setting in which the auditors had client-specific information available. They report that their round robin and nominal groups plan larger average increases in planned audit hours and are more likely to change the nature and timing of substantive tests based on the results of the brainstorming session. They also report that round robin and open discussion groups plan larger increases in the extent of substantive tests than do nominal groups.

Overall, studies that allow auditors to develop specific testable hypotheses support the notion that planning audit program changes is difficult. Auditor performance is aided by interventions that facilitate connection of fraud risks to required procedure changes ([Hoffman and Zimbelman 2009](#)). However, absent these interventions or while in conditions similar to those encountered on audits (i.e., modifying a standard audit program), auditors' program changes do not appear to be effective. This result is troubling, and the source of the difficulty cannot be determined from the current evidence. It is not clear whether auditors' difficulty with this task is due to a lack of requisite knowledge, problem solving ability, or epistemic motivation, as these factors have not been examined.

TABLE 3
Summary of Fraud Procedure Modification Studies

Study	Case Allows Specific Fraud Hypothesis Generation?	Study Manipulates Presence of Fraud or Risk Factors?	Do Possible Changes Focus on Extent or Nature of Procedures?	Effectiveness Criterion	Summary of Results
Zimbelman (1997)	No	Yes	Extent and nature	Increase in total budgeted audit hours.	Total audit hours do not differ across fraud risk condition, regardless of whether fraud risk assessment is decomposed or holistic; however, decomposed fraud risk assessment auditors assign more total hours than holistic condition auditors, regardless of fraud risk condition. Perceived audit program strength does not differ across risk assessment type or fraud risk condition.
Glover et al. (2000)	No	No	Extent	Increase in perceived audit program strength. Perceived audit program strength is measured by weighting the importance of performing five procedures (selected from a list of ten standard procedures) and the participants' perceived effectiveness of these procedures for detecting fraud. Increases in sample sizes and planned audit hours.	Auditors increase sample sizes and planned audit hours when management has an explicit incentive to misstate financial statements and the auditor has minimal corroboration of the explanation for an unexpected change in an account balance compared to other conditions.

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TABLE 3 (continued)

Study	Case Allows Specific Fraud Hypothesis Generation?	Study Manipulates Presence of Fraud or Risk Factors?	Do Possible Changes Focus on Extent or Nature of Procedures?	Effectiveness Criterion	Summary of Results
Johnstone and Bedard (2001)	NA	NA	Nature	Increases in use of specialized personnel, review layers, total planned audit hours, and audit fees.	Firms plan increased use of personnel specializing in high-risk clients and an additional layer of review for prospective clients on which at least one fraud risk factor is identified during the engagement acceptance process; total planned audit hours are not higher although planned audit fees are higher on prospective clients with at least one fraud risk factor.
Glover et al. (2003)	No	Yes	Nature and extent	Assess perceived need to modify the audit plan to detect fraud higher.	Auditors rate higher the need to modify the audit plan to detect fraud when fraud red flags are present than absent; this is more pronounced for post-SAS 82 participants.
				Increase in total audit hours budgeted.	Post-SAS 82 participants budget more total hours when fraud red flags are present than absent; no difference for the pre-SAS 82 participants.
				Higher perceived audit program strength (from Zimbelman [1997]).	Post-SAS 82 participants perceive their audit programs have higher strength than pre-SAS 82 participants; however, pre- and post-SAS 82 participants select the same top procedures and rank them in the same order.

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TABLE 3 (continued)

Study	Case Allows Specific Fraud Hypothesis Generation?	Study Manipulates Presence of Fraud or Risk Factors?	Do Possible Changes Focus on Extent or Nature of Procedures?	Effectiveness Criterion	Summary of Results
Graham and Bedard (2003)	NA	NA	NA	NA	Auditors most often list review and inquiry procedures to address fraud risks identified.
Asare and Wright (2004)	Yes	No	Nature	Increase in effectiveness of procedures specified for detecting the seeded fraud as rated by three experienced auditors.	Participants who modify a standard audit program produce less effective audit programs than auditors who list audit procedures to be performed unaided.
Mock and Turner (2005)	NA	NA	NA	Changes to audit programs planned are associated with increased fraud risk assessments.	Procedures are not modified for the majority of clients in the study, regardless of the level of their assessed client risk. When program changes are made, they are most often associated with identification of industry-based risk factors.
Blay et al. (2007)	NA	NA	Nature and timing	Increases in external evidence and proportion of procedures performed at year end associated with increases in fraud risk assessments.	Relatively more evidence is collected from external sources and a higher proportion of evidence is collected at year end when fraud risk is assessed higher.
Hoffman and Zimbelman (2009)	Yes	No	Nature and extent	Audit procedures are more effective based on comparison to three fraud experts who were asked for the "audit/forensic procedures that an expert fraud auditor would recommend for the case" (p. 825).	Both strategic reasoning and brainstorming participants change nature of procedures (i.e., focus on confirmation recipients, subsequent cash receipts testing, sales returns, and CAATS).

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TABLE 3 (continued)

Study	Case Allows Specific Fraud Hypothesis Generation?	Study Manipulates Presence of Fraud or Risk Factors?	Do Possible Changes Focus on Extent or Nature of Procedures?	Effectiveness Criterion	Summary of Results
Hunton and Gold (2010)	Yes	No	Nature and extent	Increases in planned audit hours, total number of substantive tests, and substantive tests focused on changes to the nature, timing, and extent of procedures.	The percent increase in planned audit hours due to identified fraud risks and number of substantive tests affected (including those focused on nature and timing of tests) is greater in the nominal group and round robin brainstorming conditions than in the face-to-face open discussion condition. Nominal group auditors make fewer changes to the extent of procedures than either round robin brainstorming or face-to-face open discussion conditions.
Hammersley et al. (2011)	Yes	No	Nature and extent	Participants' modifications to standard audit procedures are more effective and efficient as judged by three experienced auditors who specified a tailored audit program that would detect the seeded fraud.	Auditors in the control condition produce audit programs that have higher fraud detection quality scores and higher effectiveness scores than auditors in the heightened fraud risk condition. Auditors with heightened fraud risk produce more inefficient audit programs and are more likely to recommend ineffective sample size increases than control condition auditors.

NA indicates that the research method used does not allow categorization on this dimension.

Several recent studies have examined the decisions auditors made and documented in working papers on actual engagements and have summarized the observed relationships between fraud risk identification, fraud risk assessment, and changes to audit programs. For example, [Johnstone and Bedard \(2001\)](#) examined client acceptance decisions and noted that the firm increased the planned use of personnel who specialize in high risk clients and planned an additional layer of review for prospective clients for whom at least one red flag is identified. [Graham and Bedard \(2003\)](#) note that auditors most often list review and inquiry procedures to address fraud risks identified. [Mock and Turner \(2005\)](#) report that audit programs are not modified for the majority of clients in their sample, regardless of the level of risk assessed. However, when audit programs are modified, the changes are most often associated with industry-based risk factors. [Blay et al. \(2007\)](#) note that when fraud risk is assessed higher, auditors plan to collect relatively more external than internal evidence and they plan to collect a higher proportion of evidence at year end rather than at interim. Overall, the effectiveness of any procedure changes specified in these working paper studies is assumed; however, it is noteworthy that these studies report mixed evidence about whether firms plan changes to procedures based on risks identified. This evidence corroborates experimental findings that auditors do not always change planned audit procedures based on risks identified and provides support for additional research examining the conditions that affect auditor performance.

Overall, when auditors receive cues that signal an increased chance that fraud is present, they appear to recognize that a response is necessary and report an increased need to modify planned audit programs. This indicates that they believe audit program changes can be effective in addressing risk factors. However, when specific hypotheses are possible, it appears that auditors have trouble making effective changes to the nature of planned procedures unless they are aided. Future research could address whether this is due to a lack of knowledge, problem solving ability, or epistemic motivation applied to the task or a lack of knowledge of the potential financial statement consequences of the identified fraud risks. Evaluation of the tools used to create and modify audit programs also seems appropriate. Perhaps the use of automated audit programs has removed crucial experience, feedback, or training for auditors who must relate specific risks to specific responses to those risks. Future research can shed light on these questions.

CONCLUSION

In this paper, I describe a model of the factors affecting fraud-related audit planning judgments. In the model, I specify antecedents to fraud risk factor identification, hypothesis generation, risk assessment, and audit program changes that are currently unexamined in the fraud literature. These antecedents include characteristics of both the auditor and the available fraud risk factors. Specifically, auditor characteristics include auditor knowledge, problem solving ability, and epistemic motivation. I hypothesize that auditor knowledge is gained from both experience and training; however, fraud training is expected to play a relatively larger role than experience in fraud knowledge acquisition due to the rarity of experience with fraud. I also expect fraud knowledge to be enhanced by superior problem solving ability and epistemic motivation, and I expect that these factors play a larger role in fraud planning tasks than in other audit tasks, due to auditors' infrequent experience with fraud. While I expect these factors to affect knowledge acquisition, it is an open question whether auditors have sufficient knowledge to perform well on fraud planning tasks and at what stage in their careers, if any, they obtain this knowledge.

Fraud risk factor characteristics include the degree to which a specific testable fraud hypothesis can be generated from the available risk factors. Red flags signal that general conditions exist that may allow fraud to occur but do not provide information that is useful for specific fraud hypothesis generation. Alternatively, specific situational cues signal specific conditions that may allow fraud, and auditors can use this information to generate precise fraud hypotheses. These auditor and risk

factor characteristics are predicted to enhance mental representation development such that auditors with better-developed mental representations are expected to be more effective when identifying available fraud risk factors, generating fraud hypotheses, assessing fraud risk, and modifying planned audit procedures. Research to date has not examined the effects of these antecedents to auditor performance on these important fraud planning tasks.

In this paper, I also summarize the major findings of the fraud planning literature. The research examining risk factor identification in the brainstorming literature finds that auditors identify more fraud risk factors when the brainstorming session uses a structured form of interaction, such as following traditional brainstorming, round robin, or premortem procedures, than when interaction is unstructured. Additionally, when fraud or fraud risk factors are more salient, auditors assess preliminary fraud risk higher than when these items are less salient. However, despite appropriate sensitivity to elevated fraud risk, auditors have difficulty making effective changes to planned audit procedures. Future research is necessary to understand why this is and what type of support or training would aid auditor performance in this important task. One option may be increased consultation with forensic specialists on financial statement audits. To date, we know little about the conditions under which auditors consult these specialists, the tasks the specialists perform, whether the consultations improve audit effectiveness, and what factors affect the quality of the consultation outcomes. These are important questions to be examined by future research.

This paper contributes to the fraud planning literature in three ways. First, the model discussed in this paper suggests factors that have important implications for auditor performance that are currently under-examined in the fraud literature. Explicating the relationships between the antecedents for performance and performance in fraud planning tasks highlights the importance of these relationships. Second, in this paper, I discuss several design choices auditing researchers might consider when conducting audit planning research, such as the type of risk factors to include and the measurement of specific fraud knowledge, experience, or motivation variables. By carefully evaluating these choices, researchers can make the best use of scarce auditor-participant resources and maximize what is learned from future research studies. Finally, I summarize the findings in the fraud planning literature and provide some directions for future research.

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