Encouraging Professional Skepticism in the Industry Specialization Era: A Dual-Process Model and an Experimental Test

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ABSTRACT

I develop a framework that elucidates how the primary *target* of auditors' professional skepticism – audit evidence or their own judgment and decision making – interacts with other factors to affect auditors' professional judgments. As an initial test of the framework, I conduct an experiment that examines how the target of auditors' skepticism and industry specialization jointly affect auditors' judgments. When working inside their specialization, auditors make more automatic, intuitive judgments. Automaticity naturally manifests for industry specialists as a result of industry experience, social norms to appear knowledgeable and decisive, and their own expectations to proficiently interpret audit evidence. Priming industry specialists to be skeptical of audit evidence, therefore, has little influence on their judgments. In contrast, priming such auditors to be skeptical of their otherwise automated, intuitive judgment and decision making does substantially alter their decision processing. They begin to question what they do and do not know, in an epistemological sense, and, as a result, they elevate their overall concern about material misstatements due to well-concealed fraud. This pattern of results is consistent with my framework's predictions and suggests that specialization is more about improving the interpretation and assimilation of domain evidence, rather than about enhancing reflective, self-critical thinking. This pattern also suggests that it would be beneficial to identify other factors that promote industry specialists' skepticism towards their judgment and decision making to make them more circumspect about the possibility of management fraud (cf., Bell, Peecher, and Solomon 2005).

Keywords: Professional skepticism, professional judgment, industry specialization, fraud, preemptive self-criticism, dual-process models

"Not ignorance, but ignorance of ignorance is the death of knowledge."

- Alfred North Whitehead

I. INTRODUCTION

Audit standard setters and researchers have long recognized the importance of professional skepticism, defined in professional standards as having a questioning mind and critically assessing audit evidence (AICPA 2002, PCAOB 2007). An implicit assumption of the academic literature is that the primary *target* of auditors' skepticism is audit evidence (i.e., evidence skepticism). Bell, Peecher, and Solomon (2005), however, advocate for a new *target* of auditors' skepticism: their own judgment and decision making (i.e., judgment skepticism). In a recent review, Nelson (2009) introduces a model of professional skepticism in which three factors combine with audit evidence to influence auditors' professional judgments and actions: knowledge, traits, and incentives. In this paper, I integrate dual-processing theory from psychology (e.g., Smith and DeCoster 2000) into Nelson's (2009) model, and I use the resulting integrated framework to predict that auditors' industry specialization interacts with the target of their professional skepticism in influencing professional judgments.

I posit that specialization is more about improving auditors' interpretation and assimilation of domain evidence, than about enhancing reflective, self-critical thinking. When working inside their specialization, auditors tend to make more automatic, intuitive judgments. Automaticity naturally manifests for specialists as a result of industry experience, social norms to appear knowledgeable and decisive, and their own expectations to proficiently interpret audit evidence (Logan 1988). Priming specialists to be skeptical of audit evidence, therefore, has relatively little influence on their judgments.[1] Priming specialists to be skeptical of their

[1] Elevated professional skepticism generally enhances audit effectiveness, but can be excessive and hinder audit efficiency and client relations (Nelson 2009). For theory testing, I can determine changes in professional skepticism

otherwise automated, intuitive decision processes, however, causes a relatively substantial shift in their decision processing. They begin to question what they do and do not know, in an epistemological sense and, as a result, they elevate their concern about management fraud.

This pattern suggests that specialists' proficiency in interpreting domain evidence comes at a previously un-indentified cost: suppressing a novice-like vigilance to question one's thinking. This cost is troubling as elevating one's professional skepticism has been suggested as a means of fending off motivational and judgmental biases (e.g., Peecher 1996). In addition, regulators allege that insufficient professional skepticism is pervasive (PCAOB 2007), and is a primary cause of audit failures (Carmichael and Craig 1996) and of SEC enforcement actions (Beasley, Carcello and Hermanson 2001). A potential contributing factor is that professional standards have only recently and indirectly begun to allude to auditors directing professional skepticism towards their own judgment and decision making (e.g., IFAC 2009). Specifically, international auditing standards now explicitly recognize that auditors' professional judgment can, and should, be evaluated. The standards implicitly acknowledge the possibility of judgment errors; however, they neither educate, nor equip, the auditor to think about how to avoid making judgment errors in the first place (IFAC 2009). My integrated framework will help identify factors that promote judgment skepticism, thus helping auditors consider potential judgment errors, including being circumspect about potential management fraud (cf., Bell et al. 2005). Likewise, auditing firms may consider including judgment skepticism in their review and consultation processes, training programs, decision aids, and performance evaluations.

As an initial test of my integrated framework, I conduct an experiment employing a 2 x 3 between-participants design (*Specialization* X *Skepticism Target*) with 171 professional auditors.

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attributable to the interplay of different skepticism targets and industry specialization, but not the optimal level of professional skepticism for society.

Auditors complete a preliminary analytical review task (with no seeded misstatement or overt fraud risk indicators) in the property and casualty insurance industry. Auditors rarely encounter fraud (Ashton 1991), therefore a context devoid of fraud risk indicators is ideal. Such a context is conducive to intuitive, automatic judgments by specialists, which thereby allows the strongest test of my theory. Using a partial match-mismatch design (Low 2004), I treat auditors specializing in insurance as specialists and all other auditors as non-specialists. I manipulate the target of auditors' skepticism using their supervisors' preferences as a prime. That is, the prime varies the degree to which it characterizes supervisors as preferring auditors to question audit evidence (Evidence Skepticism; ES), or their own judgment and decision making (Judgment Skepticism; JS). I use a third, unprimed, level of this factor as a control condition. The dependent measures for participants' self-critical professional judgments are the number and probability of fraud explanations along with the probabilities assigned to unknown misstatement explanations.[2]

Consistent with my integrated framework, specialists' professional judgments depend on the target of their skepticism. Unprimed specialists are less concerned with unknown misstatements and fraud than are unprimed non-specialists. In fact, none of the 19 unprimed specialists generate a single fraud explanation. JS-condition specialists, however, generate more fraud explanations, and assign a higher probability to unknown misstatements, than unprimed specialists. In other words, JS-condition specialists worry relatively more about what they do not know and they doubt whether the absence of fraud risk indicators indicates the absence of fraud. ES-condition specialists, however, are less concerned with what they do not know, much like unprimed specialists. They do not increase consideration of fraud or unknown misstatements

[2] In the absence of fraud risk indicators, generating fraud explanations increases the justifiability of auditors' beliefs and potentially increases audit quality. For instance, medical research indicates the value of having diagnostic (e.g., fraud) hypotheses in one's initial hypothesis set in terms of evidence gathering (e.g., identifying subsequent fraud risk indicators) and ultimate diagnostic performance (Barrows et al. 1982). Also, generating fraud explanations can improve audit planning decisions (Hunton and Gold 2009), especially as fraud is most likely to go undetected when management goes to elaborate lengths to deceive (Bell et al. 2005).

consistent with use of a highly automated judgment process and high baseline confidence in their ability to interpret evidence. Unlike specialists, non-specialists worry about what they do not know irrespective of the target of their skepticism, consistent with deliberative judgment processes triggered by industry unfamiliarity. This pattern of results manifests in two significant interactions where JS-condition specialists exhibit the largest increases (compared to unprimed judgments): in the number of fraud explanations, and in the probability of unknown misstatements compared to the increases of ES-condition specialists and non-specialists subject to either prime.

This study contributes to numerous academic literatures. My integrated framework augments Nelson's (2009) model of professional skepticism by illustrating the critical role that the *target* of auditors' skepticism – audit evidence or their own judgment and decision making – has on auditors' professional judgments and how the extent of their specialization moderates this role. My framework also models how factors interactively affect professional judgments, identifies ways to augment and improve professional judgment, and answers Nelson's call for research that further specifies the form of his model. I contribute to the industry specialization literature by demonstrating that specialization, in the absence of fraud risk indicators, may inhibit self-critical thinking and by illustrating the importance of identifying factors that promote such thinking in specialists.

The remainder of this paper proceeds as follows. In Section II, I present my integrated framework. In Section III, I use the framework to predict the effects of priming evidence skepticism and judgment skepticism for both specialists and non-specialists. In Section IV, I discuss the research method. I report results in Section V. I conclude the paper in Section VI with a discussion of limitations and suggestions for future research.

II. THEORETICAL FRAMEWORK

In this section, I integrate a dual-process representation of professional judgment into Nelson's (2009) model of professional skepticism to illustrate the critical role that the target of auditors' skepticism has on their professional judgments. Before presenting my integrated framework, I define professional skepticism and introduce Nelson's (2009) model.

Professional Skepticism

Professional standards define professional skepticism as having a questioning mind and critically assessing audit evidence (AICPA 2002; IFAC 2009).[3] When making professional judgments, auditors can direct professional skepticism towards either audit evidence, or their own judgment and decision making. Professional standards and audit researchers typically describe the target of auditors' professional skepticism as being audit evidence (Kinney 2000; AICPA 2002). For example, SAS No. 99 states that:

> "…professional skepticism requires an ongoing questioning of whether the information and evidence obtained suggests that a material misstatement due to fraud has occurred. In exercising professional skepticism in gathering and evaluating evidence, the auditor should not be satisfied with less-than-persuasive evidence because of a belief that management is honest." (AICPA 2002, Paragraph 2.13)

Bell et al. (2005, 34) describe another target: auditors' own judgment and decision making. This targeting entails "…auditors being preemptively self-critical in anticipation of various arguments that others could bring against their beliefs or the evidential base they have or have not relied upon to form such beliefs." Preemptive self-criticism is a method of coping with accountability, particularly to parties with unknown preferences, and it entails thinking in

[3] See Nelson (2009) for a review of academic and professional standard definitions of professional skepticism. Academics have proposed two different baseline orientations (i.e., standards of proof) with respect to this definition: neutrality and presumptive doubt (see Nelson 2009). I favor the presumptive doubt definition as it is more consistent with regulators' and society's expectations of auditors to prevent and detect fraud (Bell et al. 2005). However, it is not necessary to do so as my theory about roles of the target of auditors' skepticism stands with either orientation. The neutrality definition is also problematic as asking auditors to be accurate (i.e., neutral) may threaten obtainment of client-aligned directional goals and increase their propensity to agree with management (Kadous et al. 2003).

flexible, multidimensional ways (Tetlock 1983a; Tetlock 1983b; Tetlock, Skitka, and Boettger 1989). Unlike evidence skepticism, judgment skepticism involves auditors embracing the potential fallibility of their judgments. Judgment skepticism recognizes the possibility of unknown misstatements including fraud (even when not overtly indicated by the evidence), as well as other potential flaws in an auditor's judgment. An auditor exercising judgment skepticism would also consider potential overconfidence by realizing that even experts are prone to judgment errors. Further, judgment skepticism applies pressure to the "illusion of objectivity" associated with otherwise unconscious motivated reasoning (Pyszczynski and Greenberg 1987).[4] This pressure on the reasonableness of motivated reasoning is consistent with professional skepticism being promoted as a means of fending off motivational biases that favor management's preferred conclusions (e.g., Peecher 1996) or other judgmental biases.[5]

Nelson's Model of Professional Skepticism

Nelson (2009) presents a model which illustrates how various factors combine with audit evidence to produce professional judgments and actions that reflect professional skepticism (Figure 1). The model is recursive in that evidence is both an input (Link 2) and output (Link 11) of auditor decision processing, whereby the output evidence becomes part of the auditor's experience (Link 12) and future input evidence into subsequent decision processing (Link 13). Skeptical judgments relate to the auditor's cognition and state of mind (e.g., hypothesis generation and probability judgment), while skeptical actions are an attribute of auditor

[4] The motivated reasoning literature examines how individuals' directional or accuracy goals affect their decision processes and resulting judgments (Kunda 1990). Motivated reasoning, which need not be conscious, increases the likelihood of individuals arriving at preferred conclusions while maintaining a semblance of rationality and justifiability (i.e., an "illusion of objectivity").

[5] With respect to motivational biases, auditors, to varying degrees, adopt client preferences (e.g., McMillan and White 1993) and exploit ambiguity to justify them (e.g., Hackenbrack and Nelson 1996). See Smith and Kida (1991) for a discussion of auditor proneness to judgmental biases and Kennedy (1995) for debiasing methods.

performance (e.g., planning decisions, audit reporting).[6] The judgment-action distinction is important because skeptical judgments do not always translate into skeptical actions (Link 1; Shaub and Lawrence 1996). In addition to evidence, the model includes three determinants of skeptical judgments (Links 3-5) and actions (Links 8-10): knowledge, traits, and incentives.

Knowledge is a product of traits (Link 6) and audit experience (Link 7). It includes knowledge of evidential patterns and frequencies of non-misstatement and misstatement explanations (cf., Libby and Luft 1993). Knowledge can promote skeptical judgments and actions due to heightened sensitivity to risk factors (Low 2004). It also leads to more complete problem representations which enable auditors to better identify partial cue patterns suggestive of misstatement and to plan audit procedures that are better able to discriminate whether such a misstatement exists (Hammersley 2006). However, knowledge may also hinder skeptical judgments and actions if it leads auditors to assume that high frequency non-misstatement explanations are correct and that missing information is consistent with non-misstatement explanations. As discussed in Section III, knowledge also may hinder professional skepticism, in the form of self-criticism, due to increased automaticity of decision processing.

Traits are non-knowledge auditor attributes that are usually considered fixed once the auditor commences audit experience and training. Nelson (2009) divides traits into three categories: problem-solving ability, ethical/moral reasoning, and dispositional skepticism. Problem-solving ability can help auditors identify potential misstatements (Bonner and Lewis 1990). Higher (lower) ethical/moral reasoning increases (decreases) sensitivity to evidence about client competence, integrity, and potential inappropriate behavior (see Jones, Massey and

[6] Nelson (2009) uses the term skeptical judgments to describe professional judgments that reflect professional skepticism. I use the more general professional judgment terminology.

Thorne (2003) for a review). Auditors also differ in their general disposition towards skeptical judgments and actions (Quadackers, Groot and Wright 2008; Hurtt 2009).

Auditors balance a multitude of countervailing skepticism-related incentives which may be direct or indirect, immediate or probabilistic, financial or social (Nelson 2009). Examples of incentives that promote skeptical judgments and actions include regulation, litigation, and reputation loss. Examples of incentives that hinder skeptical judgments and actions include client satisfaction/retention concerns and budget/fee pressures. Supervisor preferences, the social incentive used in this paper, can promote professional skepticism by invoking accountability if subordinates: 1) realize the possibility of their own judgments being biased, or 2) perceive such preferences to be diagnostic of increased risk of misstatement. On the other hand, supervisor preferences could threaten subordinates' self-concept leading to justification of current judgments (i.e., defensive bolstering; Nadler and Fisher 1986; Deelstra et al. 2003).[7] For instance, some auditors may interpret supervisor skeptical preferences to be questioning their objectivity, competence, or professionalism.

A Dual-Process Representation of Professional Judgment

My integrated framework (Figure 2) models how Nelson's (2009) determinants (knowledge, traits, and incentives), combined with audit evidence, affect auditors' dual-processing (Smith and DeCoster 2000). Dual-processing not only directly influences the targets of auditors' professional skepticism (evidence or their own judgment and decision making), but also moderates the extent to which determinants shift these targets.

[7] Supervisor preferences can also induce pressures to conform or can be perceived as diagnostic of decreased risk of misstatement. For example, Peecher (1996) provides evidence that lax supervisor preferences led to increased likelihood assessments of client explanations (i.e., decreased professional skepticism). Auditors may also perceive supervisor preferences as an accuracy goal resulting in increased cognitive effort devoted to justifying their preexisting directional goals (Kadous, Kennedy and Peecher 2003).

Psychologists have used dual-process models to explain a wide array of phenomena, from persuasion to stereotyping (see Smith and DeCoster (2000) and Evans (2008) for reviews). These models distinguish between two modes of cognitive processing: automatic and controlled (e.g., Schneider and Shiffrin 1977).[8] Individuals use both modes simultaneously with automatic processing being fast, effortless, involuntary, and non-conscious and controlled processing being slow, effortful, voluntary, and conscious (Evans 2008). The relative use of each mode (i.e., y-axis in Figure 2) is thought to depend on an individual's cognitive capacity and motivation (Smith and DeCoster 2000). If cognitive capacity is constrained (unconstrained), individuals tend to rely on more automatic (controlled) processing (Shiv and Fedorikhin 1999). Motivation to engage in more effortful, controlled processing differs based on individual, task, and environmental factors.

Where auditors reside on the dual-process continuum has implications for where they target their professional skepticism. As automatic processing often operates outside of conscious awareness (Chartrand and Bargh 1996; Bargh and Chartrand 1999; Bargh et al. 2001), individuals have difficulty reflecting upon automatic judgments (Gilbert, Krull and Pelham 1988a; Gilbert et al. 1988b; Gilbert, Krull and Malone 1990). Consequently, auditors are less likely to direct professional skepticism towards their automatic decision processing than towards their controlled processing, especially as preemptive self-criticism is associated with conscious, effortful processing (e.g., Tetlock et al. 1989). In addition, because automatic processes are most common for habitual, repetitive, and rehearsed behaviors (Logan 1988; Gobet and Simon 1996; Sloman 1996), individuals gain confidence in their intuitive and efficient automatic processing. As a result, auditors' automatic processing leads to proficiency in evaluating evidence.

[8] Some dual-process models employ other labels for each type of processing, but these general labels apply to most models (Moore and Loewenstein 2004). I am not testing whether auditors follow a specific dual-process model, but simply arguing that Nelson's (2009) determinants affect where auditors fall on the dual-process continuum.

As controlled processing is more conscious, effortful and deliberate than automatic processing, individuals have better self-insight into the former (e.g., Gilbert et al. 1988a). Controlled processing also promotes counterfactual thinking and consideration of alternative explanations whereby auditors may consider potential judgment errors, including management fraud (Koonce 1992; Clark 1997). As controlled processing is most common for non-routine tasks, auditors tend to be conservative when auditing outside of their domain expertise (Taylor 2000). The unfamiliarity of the task is a cue that established routines may be ineffective and that more deliberate analysis would likely be beneficial. Cumulatively, these factors indicate that auditors' controlled processing is likely associated with a relatively higher level of professional skepticism towards both audit evidence, and towards their judgment and decision making.

I posit that audit evidence, knowledge, traits, and incentives influence auditors' position on the dual-process continuum. As automatic processing is most common for routine behaviors, knowledge promotes automaticity. Anderson's (1983, 1987) theory of Adapted Control of Thought (ACT*) helps illustrate this relationship (Anderson 1992). His theory describes how knowledge is initially stored in declarative form (e.g., you must use a key to start a car); however, with experience knowledge becomes a largely unconscious, automatic production rule.

Likewise, automatic (controlled) processing is more likely used for frequently (infrequently) encountered evidence, such as the lack (presence) of fraud risk indicators (Ashton 1991). Traits, such as having a high (low) skeptical disposition, may be associated with controlled (automatic) automatic processing, because skeptical individuals tend to expand their information search and to delay judgment (Hurtt 2009). Incentives such as litigation risk can lead to more controlled processing to guard against audit failure on high litigation risk clients.

III. HYPOTHESIS DEVELOPMENT

In this section, I use my integrated framework to predict that in the absence of fraud risk indicators: 1) specialization inhibits self-critical thinking and 2) the efficacy, in terms of promoting self-critical professional judgments, of priming auditors to direct their skepticism towards evidence, or their judgment and decision making, depends on where they reside, as a result of their specialization, on the dual-process continuum. Priming specialists to target their judgment and decision making significantly shifts their position on the continuum towards more deliberate, self-critical processing. This shift suggests an interaction of specialization and the target of auditors' skepticism on their self-critical professional judgments. Specifically, I predict judgment-skepticism-condition specialists to exhibit the largest increase in self-critical professional judgments (compared to unprimed self-critical professional judgments) compared to the increases of evidence-skepticism-condition specialists and non-specialists subject to either prime.

Industry Specialization and Self-Critical Thinking

Public accounting firms designate auditors as industry specialists when they focus on (i.e., specialize in) audits of the financial statements of firms in a particular industry. Although the designation *officially* recognizes the auditor as an industry specialist, it is the knowledge acquired from experiences auditing firms in a particular industry that truly makes the auditor a specialist (Libby 1995; Solomon, Shields, and Whittington 1999).[9] Specialists acquire knowledge from both indirect (e.g., firm training) and direct (e.g., working on industry audit engagements) experiences, including how macro-economic forces and industry trends potentially explain fluctuations in account balances (Solomon et al. 1999).

[9] I could use the industry-specific experience or industry specialization terminology interchangeably without affecting my predictions or inferences from my results. The amount of industry-specific experience required for the industry specialist designation is unspecified by the firms or by prior research.

Specialization has numerous audit quality benefits. It improves auditors' performance in misstatement hypothesis generation and analytical procedures, which leads to superior performance in misstatement detection (e.g., Bedard and Biggs 1991; Johnson, Jamal and Berryman 1991; Wright and Wright 1997). Specialization also leads to heightened sensitivity to risk factors (Low 2004) and more complete problem representations, which enable auditors to better identify partial cue patterns suggestive of misstatement, to assess higher likelihoods of material misstatement (in the presence of a seeded misstatement), and to plan audit procedures that are better able to discriminate whether such a misstatement exists (Hammersley 2006).

In light of my integrated framework, these benefits indicate that specialization relates more to improving auditors' interpretation and assimilation of domain evidence, than to enhancing reflective, self-critical thinking. That is, there are several cognitive and motivational factors that make specialists less apt to be self-critical than non-specialists. Specialization increases automaticity of decision processing because automatic processes are most common for habitual, repetitive, and rehearsed behaviors (e.g., Logan 1988). Likewise, specialization increases auditors' confidence in their ability to assimilate evidence into risk assessments (Taylor 2000), coupled with pressures to appear knowledgeable and decisive.[10]

As automatic processing often operates outside of conscious awareness (Chartrand and Bargh 1996; Bargh and Chartrand 1999; Bargh et al. 2001), auditors are less likely to reflect upon automatic judgments. Automatic judgments are typically the first reactions and have powerful effects on controlled processes, such as informational retrieval from memory and evidence evaluation (Bargh 1989; Epstein et al. 1992; Most et al. 2001). With experience, neural

[10] Taylor's (2000) result builds on psychology literature documenting knowledge as a major determinant of confidence (Ellsberg 1961; Frisch and Baron 1988). In fact, experts tend to be overconfident, which occurs when individuals overestimate their knowledge or ability versus a normative benchmark (e.g., Fischhoff et al. 1988; Zacharias and Shepherd 2001; Malmendier and Tate 2005). Although less confident, novices are often more overconfident than experts (Kruger and Dunning 1999). The theory underlying my hypotheses only requires that specialists are more confident than non-specialists.

linkages strengthen, and become increasingly difficult to consciously override, potentially leading specialists to become unconsciously certain that particular explanations are correct (LeDoux, Romanski and Xagoraris 1991; Elliott et al. 2000; Burton 2008). If auditors are unconsciously certain, they are less likely to consciously consider their judgment fallibility.

Specialization-induced automaticity is especially likely in the absence of fraud risk indicators because activation of previously learned associations trigger automatic processing (Fiske 1998), and auditors rarely encounter misstatements especially fraud-related ones (Ashton 1991). Non-specialists, being less confident and more conservative due to industry familiarity (Taylor 2000), are more likely to use deliberate, self-critical controlled processing. Cumulatively, in the absence of fraud risk indicators, these factors make specialists less likely to worry about their judgments based on their interpretation of evidence including unknown misstatements and well-concealed fraud (i.e., not overtly indicated by the evidence).

H1: In the absence of fraud risk indicators, industry specialists' unprimed professional judgments will be less self-critical than non-specialists' unprimed professional judgments.

Shifting the Target of Professional Skepticism

In this section, I predict the efficacy of priming evidence and judgment skepticism in promoting self-critical professional judgments. My integrated framework specifies that the likely effects depend on where auditors otherwise reside on the dual-process continuum.

Evidence Skepticism

I use supervisor preferences as my manipulation of the target of professional skepticism.[11] Previous research has not documented consistent benefits of supervisors emphasizing evidence skepticism, nor has it examined its potential interactive relationship with

[11] Supervisor preferences are essentially an accountability manipulation. However, the purpose is not to examine how auditors respond to complex systems of multiple accountabilities (e.g., Gibbins and Newton 1994). The purpose is to use a strong and direct method of manipulating the target of auditors' professional skepticism.

industry specialization. For example, Peecher (1996) examined auditors' likelihood assessments of client explanations and generation of alternative explanations for an unexpected fluctuation conditional on their supervisors emphasizing being skeptical of evidence, objective, or utilizing the client's insight. He observed no difference in the professional judgments of objective-condition auditors and skeptical-condition auditors. Brown, Peecher and Solomon (1999) found that auditors who were asked to be skeptical of evidence evaluated its expected diagnosticity such that they were prone to disconfirm client management's explanations (i.e., disconfirmation proneness). However, these same auditors were also prone to overestimate the value of evidence even when its expected diagnosticity was zero (i.e., information proneness).[12] Carpenter and Reimers (2009) found that auditors elevate fraud risk assessments in response to evidence skepticism preferences, but only in the presence of overt fraud risk indicators.

My integrated framework predicts that evidence skepticism preferences are unlikely to alter the dual-processing of specialists or non-specialists. As previously discussed, non-specialists are likely to use controlled processing (i.e., deliberate, conscious, self-critical). And, as industry unfamiliarity elevates the risk of misinterpreting evidence, non-specialists likely direct a relatively higher degree of skepticism towards evidence, irrespective (i.e., whether primed or not) of evidence skepticism preferences.

Specialists' judgments, though, tend to be more automatic (i.e., effortless, intuitive) reducing the likelihood that they will adjust their decision processing in response to evidence skepticism preferences. As specialization-induced automaticity is often non-conscious (e.g., Bargh et al. 2001), highly confident specialists are less likely to be preemptively self-critical of automatic judgments and may even be unconsciously certain that an explanation is correct

[12] If auditors fail to discriminate diagnostic from non-diagnostic evidence, their belief revision and professional judgment are impaired, potentially to a degree that comprises audit effectiveness and that outweighs any audit effectiveness benefits of being prone to disconfirm client management's explanations.

(Elliott et al. 2000; Burton 2008). Specialists also face pressures to have and are confident in their proficiency in evidence evaluation (Taylor 2000). This likely results in the perception that there are limited, if any, benefits to elevating evidence skepticism, especially given the lack of fraud risk indicators. Thus, asking specialists to question their processing of evidence is unlikely to invoke more controlled processing or self-criticism on a seemingly, routine analytical review task.

Judgment Skepticism

Judgment skepticism preferences likely (do not) alter (non-specialists') specialists' position on the dual-process continuum. As discussed, non-specialists are more likely to use controlled processing. As industry unfamiliarity elevates the risk of making incorrect judgments, non-specialists likely direct a relatively high degree of skepticism towards their judgment and decision making, irrespective of judgment skepticism preferences. They appreciate the unfamiliarity of the industry and, thus, actively consider what they do not know, such as unknown misstatements and well-concealed fraud.

As discussed, *evidence skepticism preferences* are unlikely to alter specialists' decision processing due to relatively high automaticity and judgment confidence. On the other hand, *judgment skepticism preferences* attack auditors' confidence by highlighting common expert judgment errors and urging them to consider the fallibility of their judgments. For example, judgment skepticism preferences emphasize how experts are notoriously overconfident (e.g., Fischhoff, Slovic and Lichtenstein 1988). Similarly, judgment skepticism preferences imply that part of being a consummate professional is questioning one's judgment and decision making (Campbell and Hughes 2005). Cumulatively, judgment skepticism preferences activate unknown explanations in specialists' working memory (Thomas et al. 2008). Activation of unknown

explanations serves as both a motivation and a cue for the auditor to be self-critical, consistent with preemptive self-criticism being most likely when dealing with the unknown (Tetlock et al. 1989). The activation cues auditors that their judgments may be fallible and motivates them to alter their decision processing to guard against audit failure.

The resulting increase in controlled processing will likely lead auditors to consider what they do not know and to increase the probability of unknown misstatements. Essentially, auditors are assessing the probability of misstatement explanations of which they are unaware. In the absence of overt fraud risk indicators, this processing likely results in auditors recognizing the possibility of well-concealed fraud (i.e., not indicated by the evidence).

In summary, neither evidence skepticism nor judgment skepticism preferences are likely to alter non-specialists' position on the dual-process continuum due to controlled processing triggered by industry unfamiliarity. However, judgment skepticism preferences are relatively more likely than evidence skepticism preferences to alter specialists' position on the dual-process continuum. Judgment skepticism preferences serve as a motivation and cue for auditors to be self-critical of their otherwise intuitive, automatic decision processing in order to account for potential judgment errors and for misstatement explanations not indicated by the evidence. Such consideration includes failure to sufficiently consider well-concealed fraud, a potential, very serious judgment error.

H2: In the absence of fraud risk indicators, the difference between primed and unprimed auditors' self-critical professional judgments will be greatest when specialists are primed to question their own judgment and decision making, compared to audit evidence, and compared to when non-specialists are primed to question either their own judgment and decision making or audit evidence.

See Figure 3 for graphical representation of H2.

IV. RESEARCH METHOD

I employ a 2 x 3 (one measured factor and one manipulated factor) between-participants experimental design where practicing auditors complete a preliminary analytical review task for a property and casualty insurance client. Participants generate explanations for an unexpected ratio fluctuation, assign probabilities to these and unknown explanations, and assess the aggregate risk of material misstatement. I use a partial match-mismatch design (Low 2004) considering auditors specializing within insurance to be specialists, and auditors specializing in all other industries to be non-specialists. To manipulate the target of auditor skepticism, I use supervisor preferences with the skepticism emphasis being predominantly on either audit evidence (evidence skepticism; hereafter *ES*), or on the auditor's own judgment and decision making (judgment skepticism; hereafter *JS*) along with a control condition.

Participants

I employ two data collection methods (internet and paper-based) and donate $5 to a charity selected by each participant.[13] Two partners at Big 4 firms, two senior managers at large regional firms, and myself invited 371 auditors, from multiple experience levels, to participate online.[14] Eighty auditors completed the online materials, resulting in an response rate of 21.6%. Ninety-one senior-level auditors participated during firm training. The final sample includes 171

[13] As online recruiting efforts heavily targeted insurance industry specialists, there is a higher rate of such specialists in the internet responses (Internet = 47.5%; Paper = 15.4%; $\chi^2_1 = 20.75$; $p_{\text{two-tailed}} < 0.001$). As only seniors attended the training sessions, the internet sample has more experienced auditors (Internet = 8.0 years; Paper = 3.7 years; $t_{169} = 5.87$; $p_{\text{two-tailed}} < 0.001$). A concern is that paper respondents are, in general, more self-critical than internet-respondents rather than due to non-specialists' industry unfamiliarity. This possibility is unlikely as internet respondents devote more time (2.5 minutes or 14% longer; $p_{\text{two-tailed}} = 0.007$) and generate 1.36 additional explanations ($p_{\text{two-tailed}} < 0.001$). I control for response mode, general experience, and closely-related industry experience in all analyses, and am unaware of any theory suggesting an interaction with any of my independent variables. In addition, research has found internet and paper results are similar (Birnbaum 2000). All these factors indicate that response mode does not threaten the construct validity of the *Specialization* measured variable.

[14] The auditors who sent out the recruiting emails required firm and auditor anonymity leaving me unable to test for firm effects. Controlling for firm size does not affect any of the results reported herein.

auditors with an average of 5.7 years of experience (See Table 1).[15] Audit seniors, and more experienced auditors, are appropriate participants because, beginning at this level, auditors are responsible for performing preliminary analytical review procedures (Hirst and Koonce 1996).

Experimental Task

The experiment begins with background information including the client's internal control system, business objectives, risks, and industry trends (Asare and Wright 2001). I chose to not seed a misstatement nor to include fraud risk factors to operationalize a well-concealed fraud.[16] A context devoid of fraud risk indicators is beneficial because it likely promotes automaticity and confidence in specialists' decision processing, which thereby allows the strongest test of my theory by maximizing between-group variance. Practically, regulators have made allegations of pervasive insufficient professional skepticism (PCAOB 2007). As auditors rarely encounter fraud (Ashton 1991), this setting represents the environment within which auditors typically operate. That is, we should clearly be concerned with conditions where fraud is not overtly indicated, especially as: 1) fraud is most likely to go undetected when management goes to elaborate lengths to deceive (Bell et al. 2005), and 2) specialists have been shown to have superiority in identifying partial cue patterns suggestive of fraud (Hammersley 2006).

Based on random assignment, participants then encounter the *Skepticism Target* manipulation (wording to appear hereafter). Participants then read about an unexpected fluctuation in unaudited deferred policy acquisition costs.[17] A management-provided non-

[15] Six (twenty-three) auditors started, but did not complete, the paper (internet) version of the experiment. The rate did not differ by experimental condition (*ES* = 13.6%; *JS* = 20.5%; *Control* = 18.2%; $\chi^2_2 = 1.53$; $p_{two\text{-}tailed} = 0.465$).

[16] A partner specializing in insurance at a Big 4 accounting firm reviewed the case materials and concluded that they were representative of practice and that there were no overt fraud risk indicators.

[17] Deferred policy acquisition costs relate to the acquisition of policies (e.g., agent commissions), and are capitalized and amortized over the policy's life. I chose a rather basic industry-specific account to promote automaticity and confidence in specialists' decision processing. Using a basic industry-specific account also increases the likelihood of non-specialists with limited insurance experience being familiar with the account. Therefore, I measure and control for non-specialists' insurance and closely-related industry experience.

misstatement explanation (increase in commission rates) accompanies the unexpected fluctuation, as typically occurs in practice (Hirst and Koonce 1996). Participants assess the probability of this explanation accounting for substantially all of the fluctuation. Next, participants generate other explanations and assess the associated probabilities. The participants then assess the probabilities that unknown misstatement and non-misstatement explanations account for substantially all of the fluctuation followed by their risk assessments. A post-test concludes with demographic questions and measurement of control variables.

Independent Variables

I consider auditors specializing in the insurance industry to be specialists and auditors specializing in other industries to be non-specialists while controlling for the latter's experience auditing clients in insurance and closely related industries (Low 2004).[18] Although specialists are currently performing the vast majority of audits (Hammersley 2006), the inclusion of non-specialists is essential for theory testing.

For *Skepticism Target*, I manipulate the degree to which the partner emphasized ES or JS (See Appendix 1). For *ES*, note that the partner discusses how auditors often fail to exercise sufficient evidence skepticism and provides examples. For *JS*, the passage is identical to *ES* except that I change the partners' emphasis to judgment skepticism. This passage attacks confidence by discussing how experts in other fields tend to be overconfident and by providing common expert errors. In both conditions, I ask participants to recall an instance in which they failed to exercise sufficient professional skepticism. They also answer two multiple-choice

[18] Participants reported their industry specializations along with the percentage of their work year spent on insurance, other financial services, and clients in other industries. I identified seven participants who spend significant time on insurance clients (>25%) but reported no or another industry specialization and two participants who spend very little time on insurance clients (<25%) but who reported an insurance industry specialization. I reclassified these nine participants in the reported results. Inferences are unchanged by using their reported specialization or by omitting these observations. I interviewed a Big 4 audit partner who stated that he would consider an auditor who spends over 25% of their time within an industry to be a specialist. This 25% cutoff also minimizes reclassified participants.

questions that strengthen and verify attention to the manipulation. One question distinguishes ES or JS from an accuracy goal to minimize defensive reactions (i.e., Kadous et al. 2003). The other question verifies their understanding of the link between ES or JS and audit effectiveness. *Control* participants do not read either passage and proceed to the preliminary analytical review.

Dependent Variables

Participants generate explanations for the unexpected ratio fluctuation and assign probabilities (using a 0 – 100 probability scale).[19] To test my hypotheses, I use three variables that represent self-critical professional judgments: 1) the probability assigned to unknown misstatements, and 2-3) the number of and probabilities assigned to generated fraud explanations. These variables are consistent with: 1) academics and regulators considering increased attention to misstatements as an indication of having exercised professional skepticism (AICPA 2003; Nelson 2009), and 2) professional skepticism being increasingly linked to prevention and detection of fraud (Bell et al. 2005). As supplemental analysis, I also measure: the number of, and probabilities assigned to, error and non-misstatement explanations; probabilities assigned to unknown non-misstatements; and aggregate risk assessments.[20]

Even in the absence of fraud risk indicators, generating fraud explanations is important for several reasons. First, explicit consideration of fraud increases the justifiability of auditors' beliefs, which is vital in the absence of a normative benchmark, such as evaluating audit quality in the absence of an alleged misstatement (Bell et al. 2005). Second, fraud is most likely to go undetected when management goes to elaborate lengths to deceive (Bell et al. 2005). Third,

[19] A professor with six years of auditing experience and I (three years of auditing experience including numerous insurance clients) coded, while blind to experimental conditions, the explanations as non-misstatement, fraud, or error explanations. We agreed on 421 out of 465 explanations resulting in an inter-rater agreement of 90.5% and a Cohen's Kappa of 0.901 ($p < 0.001$). We mutually resolved all differences.

[20] Although error explanations are considered misstatements, professional standards typically describe professional skepticism in terms of fraud (e.g., see excerpt from SAS No. 99 in Section II). Even if I consider attention to errors to be professional skepticism, my theory is less applicable because specialists likely consider high frequency errors irrespective of a skepticism prime (Owhoso, Messier and Lynch 2002).

medical research indicates the value of having a diagnostic hypothesis (e.g., fraud) in one's initial hypothesis set in terms of evidence gathering (e.g., identifying subsequent fraud risk indicators) and ultimate diagnostic performance (Barrows et al. 1982).[21] And fourth, generating fraud explanations can improve audit planning decisions (Hunton and Gold 2009).

Control Variables

My control variables relate to: 1) Nelson's (2009) other professional skepticism determinants to control for potential differences within the specialization measured variable, and 2) auditor decision processing. For knowledge, I control *non-specialists'* insurance and closely related industry experience by adding the percent of their year spent on insurance and other financial services clients, and multiplying by a dummy variable set to 1 for non-specialists. For experience, I use years in auditing. As material misstatements may be more likely within certain industries, I measure the perceived frequency of material misstatements within participants' reported industry specialization. As a general confidence measure (i.e., a trait), participants assess their knowledge relative to same-rank auditors within their industry specialization.

I control for aspects of the participants' decision processes to assess whether *Skepticism Target* is operating consistent with the theory underlying the hypotheses. Four measures in this category are reported by all participants: 1) judgment confidence (*Confidence*), 2) consideration of judgment fallibility (*Judgment Fallibility*), 3) consideration of overconfidence (*Overconfidence*), and 4) time spent on the task (*Time*). I collect two other measures only in the two *Skepticism Target* conditions (*ES* and *JS*): 1) perception of *Skepticism Target* as an accuracy goal (*Accuracy*), and 2) the extent to which *Skepticism Target* made them defensive (*Defensive*). Finally, I control for the two modes of data collection using a dummy variable (*Internet*).

[21] Using an ill-structured task allows me to make inferences about justifiability and downstream benefits (Barrows et al. 1982), but precludes me from making normative claims about improved performance or the reduction of bias.

V. RESULTS

Manipulation Checks

In both *Skepticism Target* conditions (*ES* and *JS*), participants describe an instance when they failed to exercise sufficient professional skepticism, and they answer two multiple choice questions (See Appendix 1 for the questions and Appendix 2 for sample responses to the open-ended question). 84.2% (86.8%) of the participants in the *ES* (*JS*) conditions provided written responses.[22] 86.8% (87.5%) of the participants in the *ES* (*JS*) conditions answered both multiple choice questions correctly, indicating a successful *Skepticism Target* manipulation.[23]

Running ANCOVAs with the decision-processing variables as dependent variables also indicates a successful manipulation. Consistent with *JS* invoking more controlled processing in specialists than *ES*, *JS*-condition specialists spend significantly more time on the task (21.1 minutes) than *ES*-condition specialists (18.3 minutes; $F_{1,164} = 2.03$; $p_{one\text{-}tailed} = 0.073$). *JS*-condition auditors also significantly increase their consideration of judgment fallibility (*JS* = 6.35; *Control* = 5.84; $F_{1,164} = 2.73$; $p_{one\text{-}tailed} = 0.050$) and overconfidence (*JS* = 4.99; *Control* = 4.06; $F_{1,163} = 2.73$; $p_{one\text{-}tailed} = 0.033$). Meanwhile, compared to *Control*-condition auditors, *ES*-condition auditors do not significantly increase their consideration of judgment fallibility (*ES* = 6.08; $F_{1,164} = 0.87$; $p_{two\text{-}tailed} = 0.353$) or overconfidence (*ES* = 4.75; $F_{1,164} = 1.51$; $p_{two\text{-}tailed} = 0.222$).[24] These four contrasts provide evidence of a successful *JS* manipulation; however, in the

[22] A professor with two years of auditing experience and myself, with three years of auditing experience, coded the open-ended responses as primarily ES or JS instances while blind to experimental conditions. Out of 94 total responses, 20 responses were too general to code, resulting in 74 codable responses. We agreed on 61 explanations producing an inter-rater agreement of 82.4% and a Cohen's Kappa of 0.649 ($p < 0.001$). We mutually resolved all differences. The correct coding rate of 89.2% (66 out of 74) is statistically better than 50% ($\chi^2 = 45.46$; $p < 0.001$) indicating a successful manipulation between *ES* and *JS*.

[23] Excluding the participants who did not provide a written response and/or incorrectly answered the multiple choice questions does not qualitatively change any of the results. The correct response rate for the multiple choice questions is better than 50% in both the *ES* ($\chi^2 = 28.70$; $p < 0.001$) and *JS* ($\chi^2 = 27.00$; $p < 0.001$) conditions.

[24] *JS*-condition specialists report a significantly higher level of *Judgment Fallibility* and *Overconfidence* compared to *ES*-condition and *Control*-condition specialists (*Judgment Fallibility*: F= 2.44; $p_{one\text{-}tailed} = 0.060$; *Overconfidence*:

development of my hypotheses, I discuss how the largest effect (compared to *Control*) on these two variables would be for *JS*-condition specialists. To examine these differential effects, I used the following planned contrast coding (Buckless and Ravenscroft 1990):

$$3*(JS^{S} - Control^{S}) - 1/3*(ES^{S} - Control^{S} + JS^{NS} + ES^{NS} - 2*Control^{NS}) > 0 \quad (1)$$

This contrast is significant for *Judgment Fallibility* ($F_{1,163} = 2.079$; $p_{one\text{-}tailed} = 0.075$) but not *Overconfidence* ($F_{1,164} = 1.63$; $p_{one\text{-}tailed} = 0.101$).[25] As there were no differences in *Accuracy* or *Defensive*, the distinction between *ES* and *JS* primarily relates to time spent on the task (i.e., more controlled processing) and to judgment fallibility consideration.

Unknown Misstatement Explanations

For my first test of H1 and H2, I employ the probability that participants assigned to unknown misstatement explanations for the unexpected fluctuation in the DAC balance (see ANCOVA reported in Table 2).[26] Within the *Control* condition, non-specialists assign a significantly higher probability to unknown misstatements than specialists ($Control^{NS} = 1.04$; $Control^{S} = 0.76$; $F_{1,163} = 3.26$; $p_{one\text{-}tailed} = 0.036$), which supports H1.

To test H2 - that the increase (compared to *Control*) in the probability of unknown misstatements would be highest for *JS*-condition specialists compared to the increases of *ES*-condition specialists, *ES*-condition non-specialists, and *JS*-condition non-specialists - I use planned contrast (1) within the ANCOVA. This contrast is significant ($F_{1,163} = 4.09$; $p_{one\text{-}tailed} = 0.022$), which supports H2. See Figure 4 for graphical representation of results.

F = 2.70; $p_{one\text{-}tailed} = 0.051$), but not when compared to only *ES*-condition specialists (*Judgment Fallibility*: F= 0.80; $p_{one\text{-}tailed} = 0.187$; *Overconfidence*: F = 0.67; $p_{one\text{-}tailed} = 0.208$). The lack of difference between *ES* and *JS* is likely due to some *ES*-condition specialists perceiving their consideration of fraud (See H1 and H2 results) as judgment fallibility/overconfidence consideration, on a post-test basis.

[25] Throughout the remainder of this paper, superscripts of S(NS) refer to specialists (non-specialists).

[26] Participants separately reported the probabilities that the fluctuation was due to: a) an unknown misstatement explanation, b) a combination of misstatement explanations, and c) a combination of misstatement and non-misstatement explanations. I use the sum of these three probabilities in the analysis reported herein. As categories b) and c) could be combinations of known and unknown explanations, I ran all analyses with only a) and a factor score (factor loadings: a): 0.788; b): 0.896; c) 0.643) and I observe qualitatively similar results.

I obtain further support for this interaction by comparing the simple main effects of each skepticism target to *Control*. *JS* significantly increases specialists' probability of unknown misstatements compared to *Control* (JS^S = 1.25; $Control^S$ = 0.76; $F_{1,163}$ = 6.44; $p_{one\text{-}tailed}$ = 0.006), an increase of 66%. Similar contrasts compared to *Control* are insignificant for *ES*-condition specialists, *ES*-condition non-specialists, and *JS*-condition non-specialists (all $p_{two\text{-}tailed} > 0.10$). A contrast using weights of +2 (JS^S = 1.253), -1 (ES^S = 0.987), and -1 ($Control^S$ = 0.755) indicates that *JS*-condition specialists assess a higher probability of unknown misstatements compared to specialists in the other two conditions ($F_{1,163}$ = 4.83; $p_{one\text{-}tailed}$ = 0.015).[27] Cumulatively, H2 is supported with respect to unknown misstatements and consistent with only *JS*-condition specialists increasing the probability because *ES* preferences do not alter specialists' automatic processing and non-specialists assign a relatively high level to unknown misstatements irrespective of supervisor preferences.

Fraud Explanations

As a second test of H1 and H2, I conduct a factor analysis on the number and probability of fraud explanations that participants generated for the unexpected fluctuation in the DAC balance. The results indicate that both of these variables load on the same factor (eigenvalue = 1.77; see factor loadings in Table 3 Panel A). Using the factor scores as a dependent variable, I ran an ANCOVA (Table 3 Panel C). Supporting H1, non-specialists' *Fraud Factor Score* is significantly higher than specialists within the *Control* condition ($Control^{NS}$ = 0.03; $Control^S$ = -0.33; $F_{1,162}$ = 2.58; $p_{one\text{-}tailed}$ = 0.055). In fact, none of the 19 specialists in the *Control* condition generated a single fraud explanation.

[27] A contrast of *ES*-condition and *JS*-condition specialists is insignificant (ES^S = 0.99; JS^S = 1.25; $F_{1,163}$ = 1.63; $p_{one\text{-}tailed}$ = 0.102), but is significant when removing the two covariates from the ANCOVA (F = 2.12; $p_{one\text{-}tailed}$ = 0.073).

To test H2 - that the increase (compared to *Control*) in fraud consideration would be highest for *JS*-condition specialists compared to the increases of *ES*-condition specialists, *ES*-condition non-specialists, and *JS*-condition non-specialists - I use the planned contrast (1) within the ANCOVA. This contrast is insignificant ($F_{1,162}$ = 1.30; $p_{one\text{-}tailed}$ = 0.128), which fails to support H2. Comparing the simple main effects of each skepticism target to *Control* clarifies the lack of support for this predicted interaction. Consistent with H2, *JS* significantly increases specialists' consideration of fraud compared to *Control* (JS^S = 0.14; $Control^S$ = -0.33; $F_{1,162}$ = 2.94; $p_{one\text{-}tailed}$ = 0.044). However, an insignificant increase in *ES*-condition specialists' consideration of fraud (ES^S = 0.06; $Control^S$ = -0.33; $F_{1,162}$ = 2.36; $p_{two\text{-}tailed}$ = 0.126) dampens the significance of the interaction.[28] This result is consistent with the increasing link between skepticism and fraud (Bell et al. 2005). This result is also encouraging as ES preferences lead some highly confident specialists to consider fraud even when not indicated by the evidence.

A repeated measure ANCOVA using the raw data (i.e., number and probability of fraud explanations) further clarifies the lack of support for H2. Within this ANCOVA (not tabulated), the H2 contrast is significant for the number of fraud explanations ($F_{1,162}$ = 2.05, $p_{one\text{-}tailed}$ = 0.077), but not for the probability of fraud explanations ($F_{1,162}$ = 0.50; $p_{one\text{-}tailed}$ = 0.240). That is, *JS*-condition specialists are the most likely to increase consideration of fraud explanations (compared to all other conditions), but are not as likely to assign a high probability to these explanations. In the absence of fraud risk indicators, this pattern of results is arguably appropriate because, by definition, fraud is unlikely to be present. Likewise, explicit consideration of fraud increases the justifiability of auditors' beliefs. It may also have benefits in audit planning (Hunton and Gold 2009) and execution, such as superior identification of

[28] Consistent with H2 and with non-specialists considering fraud irrespective of supervisor preferences due to self-critical controlled processing triggered by industry unfamiliarity, neither type of supervisor preference increased non-specialists' consideration of fraud (all $p_{two\text{-}tailed} > 0.10$).

subsequently encountered fraud risk indicators. The results are stronger for the number than for the probability of fraud explanations, which partially supports H2.

Supplemental Analysis

I conduct four supplemental analyses. First, I examine other determinants of self-critical professional judgments. Second, I use a mediation analysis to provide evidence that my dependent variables are capturing self-criticism. Third, I assess the quality of fraud explanations. And fourth, I analyze participants' other professional judgments.

Other Determinants of Self-Critical Professional Judgments

Collectively, the significant covariates identify other factors associated with self-critical professional judgments and lend further empirical support to my integrated framework. Not surprisingly, participants' perceived frequency of misstatements within their industry specialization (*Misstatement Sensitivity*) is positively associated with the probability of unknown misstatements ($p_{two\text{-}tailed}$ = 0.023). Non-specialists' insurance and closely-related industry experience is negatively associated with unknown misstatements ($p_{two\text{-}tailed}$ = 0.041), which is consistent with my integrated framework wherein proximity to an industry elevates automaticity and confidence, and thereby decreases the likelihood that auditors are self-critical.

Consistent with my integrated framework, judgment fallibility consideration (*Judgment Fallibility*) is positively associated with fraud consideration ($p_{two\text{-}tailed}$ = 0.047). Yet, unexpectedly, consideration of overconfidence (*Overconfidence*) is negatively associated with skepticism in terms of fraud explanations ($p_{two\text{-}tailed}$ = 0.001). To further investigate, I calculate bivariate correlations of *Overconfidence* and *Fraud Factor Score* in each of the six conditions. The negative association is only significant for non-specialists in the *ES* and *JS* conditions. As I will discuss below, non-specialists increase the probability of error explanations in response to

both evidence skepticism and judgment skepticism preferences, which appear to inhibit their consideration of well-concealed fraud.[29] In the next section, I further investigate an unexpected finding: the lack of association between *Judgment Fallibility* and *Unknown Misstatements.*

Mediation Analysis

To provide further support for my theory that increased self-criticism (primed by judgment skepticism preferences) will lead specialists to increase the probability of unknown misstatements, I employ a Baron and Kenny (1986) mediation analysis. As my theory suggests that judgment skepticism preferences will only increase judgment fallibility consideration (i.e., self-criticism) for *JS*-condition specialists, I conduct the mediation analysis with only the *Control*-condition and *JS*-condition specialists. Within this small sample (n = 38), I fail to observe a significant correlation between *Judgment Fallibility* and *Unknown Misstatements* ($p_{one\text{-}tailed} = 0.133$). For noise reduction, I sum all of the participant's probabilities (misstatement and non-misstatement) and force additivity to 100%.[30] This transformed variable *Unknown Misstatements* ^{FA} is significantly associated with the *JS* manipulation ($p_{one\text{-}tailed} = 0.011$), which satisfies Step 1. The *JS* manipulation is positively associated with the mediator (*Judgment Fallibility*), which satisfies Step 2 ($p_{one\text{-}tailed} = 0.057$). The data satisfies the third step as *Judgment Fallibility* is positively correlated with *Unknown Misstatements* ^{FA} ($p_{one\text{-}tailed} = 0.031$). However, when controlling for *Judgment Fallibility,* the *JS* manipulation is still associated with *Unknown Misstatements* ^{FA} ($p_{one\text{-}tailed} = 0.023$) indicating partial mediation. Partial mediation

[29] The only other significant covariate in Tables 2-3 is *Internet* ($p_{two\text{-}tailed} = 0.023$) being positively associated with fraud consideration. There is a reasonable effort-based explanation. Recall that internet respondents devoted more effort to the task (see footnote 13). If participants devote more cognitive effort to generating explanations, they are likely to generate more fraud explanations. Of course, a host of other possibilities could explain these results. As I did not observe any significant interactions between *Internet* and my primary independent variables (*Specialization* and *Skepticism Target*), including *Internet* as a covariate properly controls for the effect.

[30] This transformation reduces noise by eliminating differences due to various interpretations of the probability scales. All results are qualitatively unchanged using forced additivity measures. A FA superscript denotes a forced additivity measure.

supports my theory that judgment skepticism preferences increase specialists' consideration of unknown misstatements by fostering self-criticism. However, judgment skepticism preferences increase consideration of unknown misstatements in other ways. Future research could identify other features of judgment skepticism preferences that increase such consideration.

Quality of Fraud Explanations

Due to industry knowledge, it is likely that specialists' fraud explanations incorporate more contextual industry-specific information than non-specialists' fraud explanation, which makes specialists better able to design appropriate audit tests. An auditing professor, with three years of auditing experience, and I assigned context scores to the fraud explanations, while blind to the experimental conditions, using a 3 point scale (1 = devoid of context, 2 = some context, 3 = rich context).[31] The specialists' fraud explanations (*Fraud Context Score* = 2.57) incorporated significantly more context than those of non-specialists (*Fraud Context Score* = 1.45; $t_{25} = 4.34$; $p_{\text{two-tailed}} < 0.001$). As no *Control*-condition specialists generated a single fraud explanation, this result demonstrates the importance of promoting judgment skepticism in specialists as they appear well-equipped to consider potential frauds due to their industry knowledge.

Other Professional Judgments

I ran a repeated measures ANCOVA (not tabulated) with the number and probability of generated error explanations as dependent variables.[32] Due to industry experience, specialists are likely to actively consider high frequency errors, irrespective of supervisor preferences (Owhoso et al. 2002). Accordingly, neither *ES* nor *JS* affect specialists' number or probability of generated error explanations. Likewise, non-specialists are likely to actively consider errors due to conservatism associated with controlled processing triggered by industry unfamiliarity.

[31] We initially agreed on 23 out of 27 fraud explanations resulting in an inter-rater agreement of 85.2% and a Cohen's Kappa of 0.773 ($p < 0.001$). We mutually resolved all differences.

[32] Within the ANCOVA, *Years of Experience* and *Judgment Fallibility* are significant covariates.

Although neither *ES* nor *JS* affect non-specialists' *number* of generated error explanations, *ES* did lead to an increase in non-specialists' *probability* of generated error explanations (*ES* = 0.16; *Control* = 0.06; $F_{1,162} = 5.40$; $p_{two\text{-}tailed} = 0.021$). A post hoc explanation for this pattern of results is that *ES*-condition non-specialists could not generate additional error explanations; instead, they viewed the preferences as diagnostic of increased risk of erroneous assertions.

My results are consistent with *ES* and *JS* not affecting the number or probabilities of non-misstatement explanations, which is also consistent with academics and regulators considering professional skepticism as attention to misstatement explanations (AICPA 2003; Nelson 2009).[33] There was, however, one exception. Consistent with *JS* activating unknown explanations in working memory, such preferences led to a decrease in the probability of unknown non-misstatements in non-specialists (*JS* = 0.84; *Control* = 1.02; $F_{1,163} = 3.42$; $p_{two\text{-}tailed} = 0.066$). Non-specialists likely realize they are limited with respect to non-misstatement knowledge and, thus, view *JS* preferences as an indication that unknown non-misstatements are less probable.

My integrated framework does not make clear predictions of the extent to which changes in self-critical professional judgments will be impounded into aggregate risk assessments.[34] That is, increased self-criticism does not necessarily, nor normatively, lead to a perception of increased risk of misstatement, especially considering the lack of a normative benchmark (i.e., higher risk assessments are not necessarily better). For participants' risk assessments (*RMM*), none of the simple main effects of *ES* or *JS* versus *Control* are significant (all $p_{two\text{-}tailed} > 0.10$), for either specialists or non-specialists. Even though *ES* increased non-specialists' probability of

[33] I ran a repeated measure ANCOVA (not tabulated) with the four non-misstatement measures (number and probabilities of self-generated non-misstatement explanations and the probabilities of the management-provided explanation and unknown non-misstatements). Consistent with prior studies (Solomon et al. 1999), I observe a main effect of *Specialization* ($p = 0.012$). All simple main effects of *ES* or *JS* versus *Control* are insignificant ($p_{two\text{-}tailed} > 0.10$) unless otherwise noted. The significant covariates are *Internet* and the general confidence measure.

[34] I ran an ANCOVA (not tabulated) with the participants' aggregate risk assessment as the dependent variable. Consistent with non-specialists' conservative risk assessments in prior studies (Taylor 2000), I observe a significant main effect of *Specialization* ($p = 0.026$). The only significant covariate is *Misstatement Sensitivity*.

error explanations for non-specialists, the lack of results on *RMM* is not particularly surprising due to non-specialists typically being conservative in their risk assessments (Taylor 2000).

On the other hand, *JS*-condition specialists generate more fraud explanations and increase the probability of unknown misstatements, but do not seem to impound the elevated self-criticism into their aggregate risk assessments. For fraud explanations, the lack of increased risk assessments is not surprising as *JS*-condition specialists did not assign a significantly higher probability to fraud explanations. As for the increased probability of unknown misstatements, *JS*-condition specialists may have difficulty aggregating the unknown into risk assessments. Then again, in the absence of fraud risk indicators, considering unknown misstatements and fraud explanations, but not increasing risk assessments, may actually be appropriate from an audit efficiency standpoint. Although *JS*-condition specialists do not increase their risk assessments, there could still be considerable effects on audit planning and execution because the level of risk assessment is only one input (e.g., source of risk) in these decisions. Future research examining the relationship between self-critical professional judgments, risk assessments, and audit planning and execution would be beneficial.

VI. CONCLUSION

In this paper, I integrate dual-processing theory (Smith and DeCoster 2000; Evans 2008) into Nelson's (2009) model of professional skepticism. The resulting integrated framework illustrates the critical role that the *target* of auditors' skepticism – audit evidence or their own judgment and decision making – has on their professional judgments. I then use my framework to predict that industry specialization interacts with the target of professional skepticism to influence professional judgments.

My experimental results largely support my predictions. Unprimed, specialists are less concerned than non-specialists with what they do not know. The most striking evidence is that none of 19 specialists in the control-condition generated a single fraud explanation. Yet, when primed to be skeptical of their judgment and decision making, specialists began to worry about unknown misstatements and well-concealed fraud. In fact, the largest increase (compared to unprimed professional judgments) in the number of fraud explanations, and the probability of unknown misstatements, occurs for *JS*-condition specialists in comparison to the increases of *ES*-condition specialists, *ES*-condition non-specialists, and *JS*-condition non-specialists. These results demonstrate that exercising judgment skepticism makes specialists not only experts in the evaluating evidence, but also self-critical and circumspect about management fraud. This occurs even when the evidence does not overtly indicate fraud, thereby increasing the justifiability of auditors' beliefs.

This study is subject to limitations in addition to those typically associated with experimental research. First, I only capture professional judgments within preliminary analytical review and within one industry; however, I am not aware of any theory that suggests that auditors' decision processes are fundamentally different in other audit judgment tasks or industries. Second, auditors may become sensitized to judgment skepticism, thus weakening its benefits over time. Third, although I observe theory-consistent increases in specialists' self-criticism, this does not mean that there are not boundary conditions on the effectiveness of judgment skepticism preferences. Some evidence suggests experts are overconfident (e.g., Malmendier and Tate 2005); therefore, specialists may, under certain conditions, resist such preferences, may view self-criticism as unnecessary, or may even become defensive if the preferences threaten their expertise. Fourth, Bell et al. (2005) recommend using judgment

skepticism as a complement to evidence skepticism. Therefore, a hybrid preference which strongly emphasizes both skepticism targets may be optimal in terms of promoting self-criticism. Fifth, I purposely employed an ill-structured audit task which does allow me to make some inferences about likely benefits in terms of justifiability, but that also precludes me from making normative statements about the reduction of auditor bias. Future research could employ unambiguous normative benchmarks and examine judgment skepticism as a debiaser (cf. Grenier, Peecher and Piercey 2009).

This paper suggests several other directions for future research. Researchers could examine how the target of auditors' professional skepticism interacts with other auditor, task, or environmental factors in producing self-critical professional judgments. For example, one could examine institutional features of auditing firms, such as supervision and review, that moderate the extent of specialists' self-criticism. Similarly, researchers might consider how different levels and types of audit risks, and different judgment tasks with varying levels of complexity, potentially moderate the inferences drawn in this study. My integrated framework will help researchers predict the effects of these, and other, factors on professional judgments. It would also be worth examining how evaluators of auditors (e.g., regulators, jurors) view industry specialists' documented self-critical professional judgments. Finally, future research could model how professional judgments affect risk assessments, and the planning and execution of the audit.

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Appendix 1: Skepticism Target Manipulation

Panel A: Evidence Skepticism (ES)

Recent professional standards and the PCAOB stress the exercising of professional skepticism to prevent and detect fraud. The engagement partner is concerned that our auditors sometimes might not exercise sufficient professional skepticism. Specifically, the engagement partner is concerned that our auditors sometimes fail to approach management-provided explanations and other audit evidence with sufficient professional skepticism. This concern is based on evidence that auditors across a variety of engagements do not actively question management assertions or critically assess audit evidence. Other examples of auditors not being sufficiently skeptical of evidence include:

- Failure to gather sufficient information
- Overweighting evidence that confirms expectations
- Reliance on management's honesty and integrity

Please ensure that you are sufficiently skeptical of evidence when performing this analytical review. In 2-3 sentences, describe an instance when you were not sufficiently skeptical of management-provided explanations or other audit evidence.

The partner on this task is primarily concerned…

- ❑ with my judgment accuracy.
- ❑ with me being skeptical of management-provided explanations and other audit evidence.

Actively questioning management's assertions and critically assessing audit evidence increases the effectiveness of audits.

- ❑ True
- ❑ False

Panel B: Judgment Skepticism (JS)

Recent professional standards and the PCAOB stress the exercising of professional skepticism to prevent and detect fraud. The engagement partner is concerned that our auditors sometimes might not exercise sufficient professional skepticism. Specifically, the engagement partner is concerned that our auditors, even when focused on accuracy, sometimes fail to actively consider the possibility of making incorrect judgments and decisions. This concern is based on pervasive evidence that experts in a variety of fields, such as medicine and law, tend to be overconfident in their judgments, and, on occasion, make incorrect judgments. Common expert errors include:

- Failure to gather sufficient information
- Overweighting evidence that confirms expectations
- Overconfidence in own or others' technical knowledge

Please ensure that you are sufficiently skeptical when performing this analytical review in terms of considering the possibility of making incorrect judgments. In 2-3 sentences, describe an instance when you were overconfident precluding you from actively considering the possibility of making incorrect judgments.

The partner on this task is primarily concerned…

- ❑ with my judgment accuracy.
- ❑ with me being skeptical of my judgment and decision making and actively considering the possibility of making incorrect judgments.

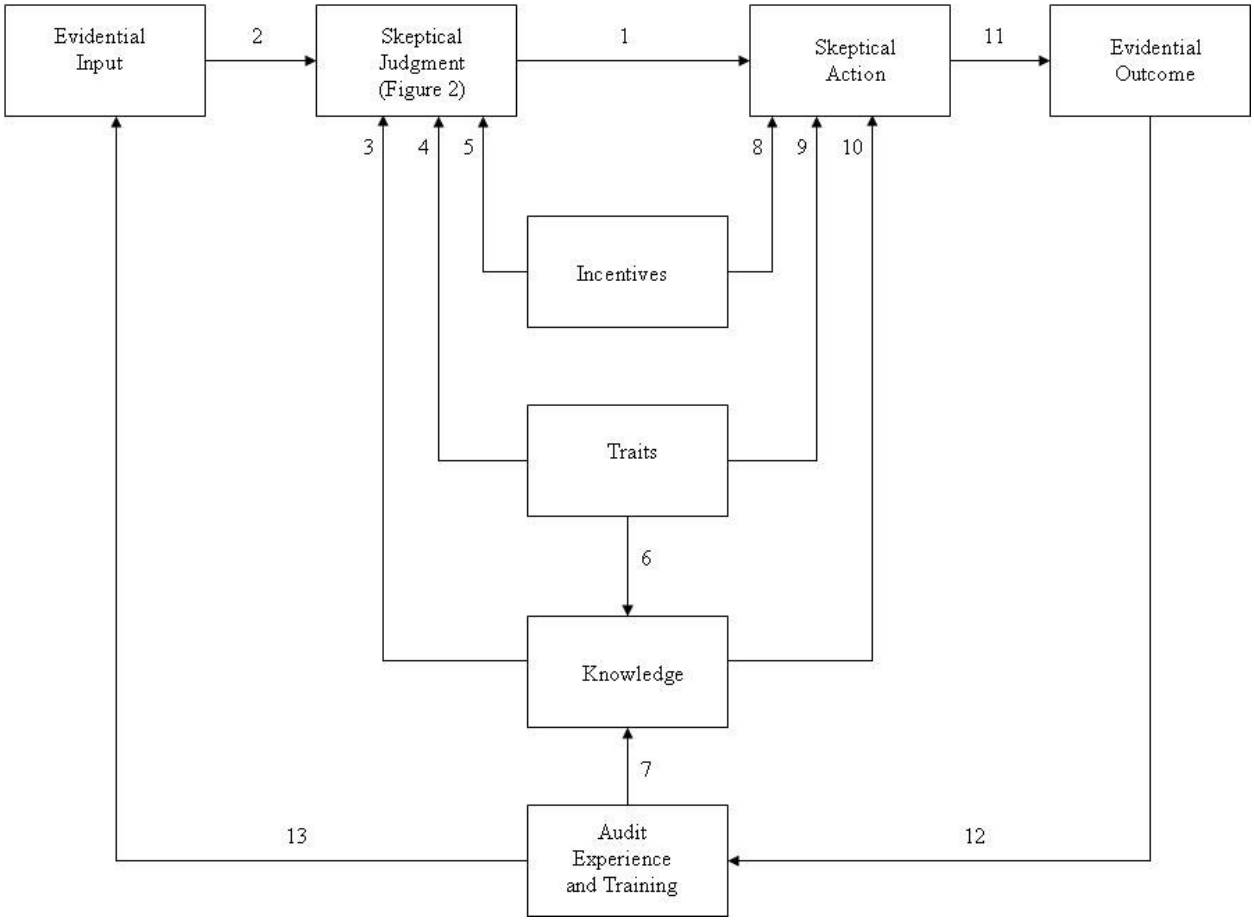
Overconfidence sometimes leads to experts making incorrect judgments and, therefore, can be detrimental to the effectiveness of audits.

- ❑ True
- ❑ False

Appendix 2: Sample of Open-Ended Responses

Evidence Skepticism	Judgment Skepticism
Please ensure that you are sufficiently skeptical of evidence when performing this analytical review. In 2-3 sentences, describe an instance when you were not sufficiently skeptical of management-provided explanations or other audit evidence.	Please ensure that you are sufficiently skeptical when performing this analytical review in terms of considering the possibility of making incorrect judgments. In 2-3 sentences, describe an instance when you were overconfident precluding you from actively considering the possibility of making incorrect judgments.
Responses	
During my first busy season, I took the word of the HR dept regarding headcounts of one of my client's subsidiaries and it turned out to be wrong.	While auditing a low risk routine area such as fixed assets, assumed the depreciation expense was right although the analytical procedures were not within our precision range. I was confident that the number had to be right, but there were variables in our analytic that were not considered.
With certain clients with very qualified personnel and a history of "adjustment-free" audits, I tend to be more trustworthy and less skeptical. A client of mine recently made a .5% change to their DAC calculation and looking back I didn't really question their motives.	I had been on the same client for 5 years and knew their business very well, however, they developed a new business line and it performed better than expected. The actuaries that reviewed the claims experience felt the reserve was overstated. I was too focused on my prior knowledge to entertain the notion that perhaps they should reduce the reserve.
Management representations are often over-relied upon in lieu of obtaining substantive audit evidence. For example, I had an experience where a company had assets held for sale and a large part of the audit evidence supporting the fair value was management representation in lieu of specific fair value computations.	On our team, we have encountered times when we were confident that an error we suspected was present would be immaterial. We did do further testing and discovered that it was not, but probably would not have done so without the guidance and involvement of more senior members of the engagement team.
During substantive analytics over payroll, we did not verify the average compensation percentages provided by the benefits manager as the amounts provided confirmed our expected payroll expense. The payroll expense was recalculated after looking at the year-end ledger balance.	On one certain client that I was on, I had a very strong knowledge of their business and related accounts (their business was very consistent year over year). When performing account fluctuations, I may have been overconfident in my ability to predict the relationship of certain accounts, whereas the reason for the increase may have been due to another reason other than my expectation (i.e. flat change may have been a "netting" of two changes, rather than no change in the account).
We believed we had all of the Restricted Stock Award Agreements applicable to the client's Stock Incentive Plan, because they were publicly filed, so we had made certain conclusions around accounting for award modifications based on those agreements. We did not sufficiently question management as to whether there were additional agreements specific to each employee which further explained the terms of the r-stock awards and ended up changing our conclusions for accounting for award modifications.	On an engagement that I have been on for several years, I reviewed the client's loss reserves similar to how I had reviewed them in prior year. I was so confident that I understood the reserving methodology that I did not consider that I could have misunderstood how the reserving was set in the current year.
In performing routine inquiries (e.g., is management aware of any adverse regulatory communications, any adverse results of other external exams/audits, etc), I accepted management's responses without much skepticism. The inquiries have not identified such matters in the past and management has trustworthy track record.	Upon taking on a job that was new to me as a manager I placed more reliance than I should have on the prior team's work. I should have spent more time challenging some of the conclusions and understanding them such that I could own them throughout the audit process.

Figure 1: Nelson's (2009) Model of Professional Skepticism



Nelson's (2009) model illustrates how auditor knowledge, traits, and incentives combine with audit evidence to produce judgments and actions that reflect professional skepticism. The model is recursive in that evidence is both an input (evidential input; Link 2) and output (evidential output; Link 11) of auditor decision processing whereby the output evidence becomes part of the auditor's experience (Link 12) and future input evidence into subsequent decision processing (Link 13). Skeptical judgments relate to the auditor's cognition and state of mind (e.g., hypothesis generation and probability judgment) and must reach a threshold to produce skeptical actions (Link 1; Shaub and Lawrence 1996). Skeptical actions are an attribute of auditor performance (e.g., planning decisions, disposition of audit differences, audit reporting).

In addition to evidence, the model includes three determinants of skeptical judgments (Links 3-5) and actions (Links 8-10): knowledge, traits, and incentives. Knowledge is a product of audit experience/specialization (Link 7) and traits (Link 6) and includes knowledge of evidential patterns and frequencies of non-misstatement and misstatement explanations. Traits are non-knowledge attributes of the auditor that are usually considered fixed once the auditor commences audit experience and training. Nelson (2009) divides traits into three categories: problem-solving ability, ethical/moral reasoning, and dispositional skepticism (e.g., Hurtt 2009). Auditors balance a multitude of countervailing PS-related incentives that may be direct or indirect, immediate or probabilistic, and financial or social (Nelson 2009).

Figure 2: A Dual-Process Representation of Professional Judgment

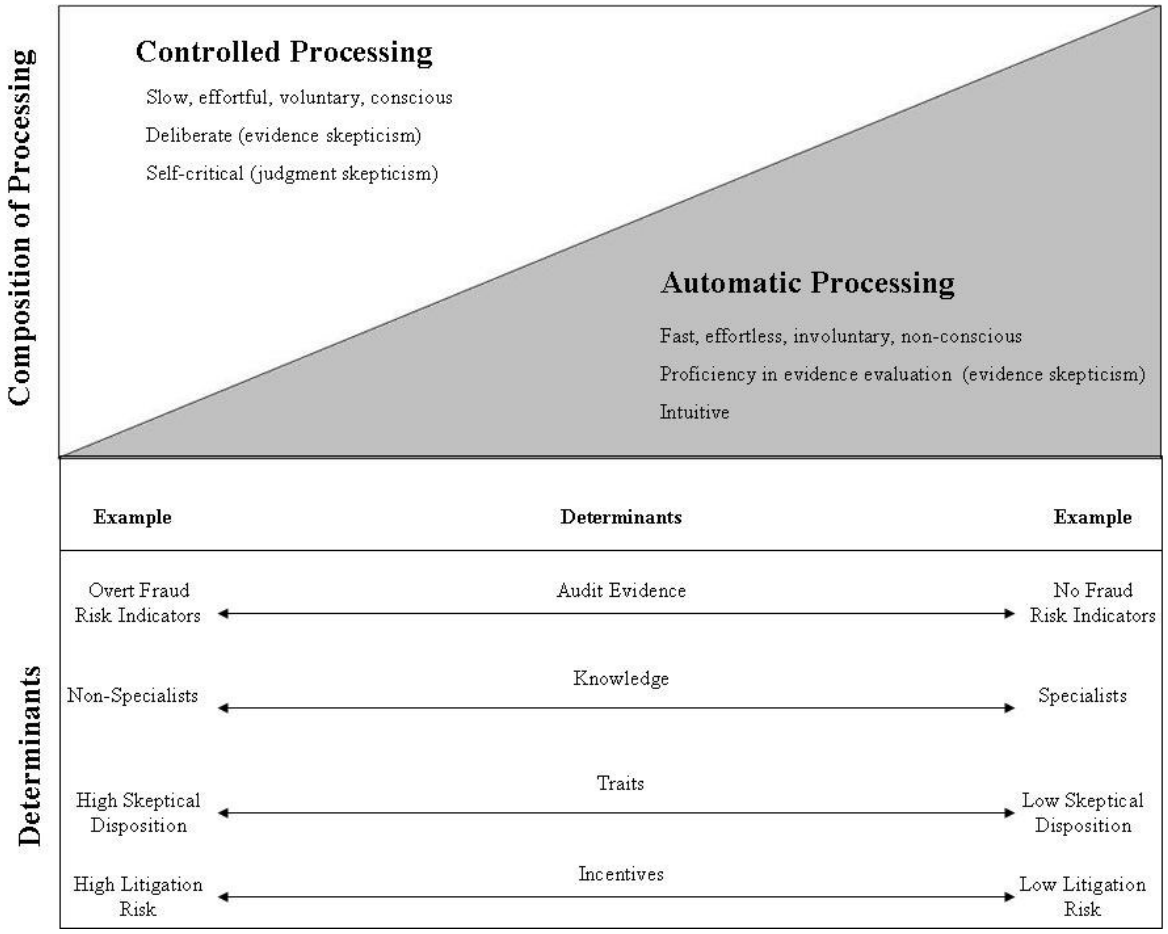
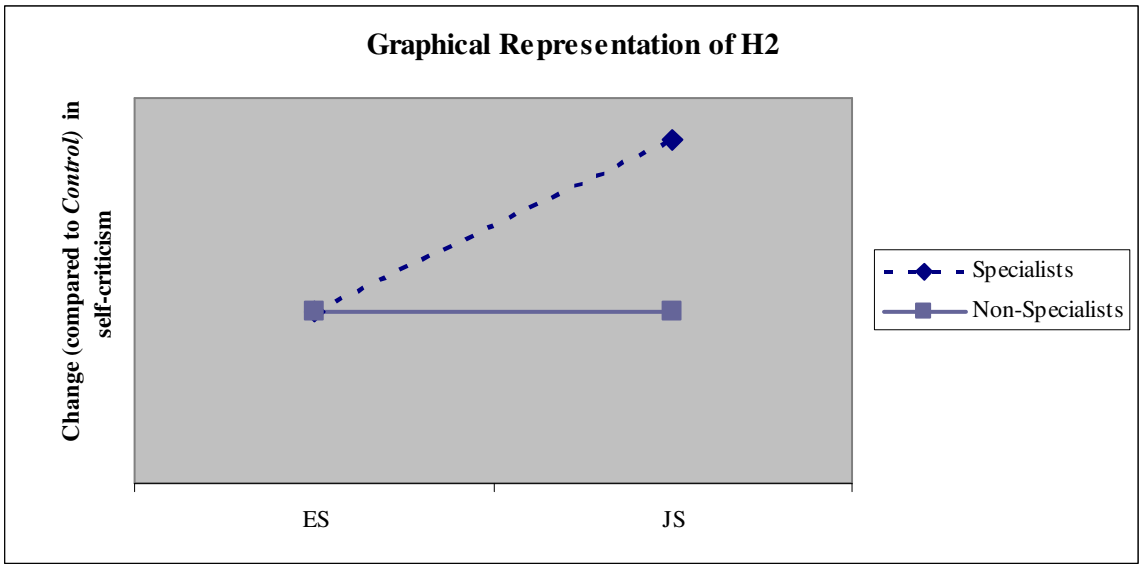


Figure 3: Graphical Representation of Hypotheses

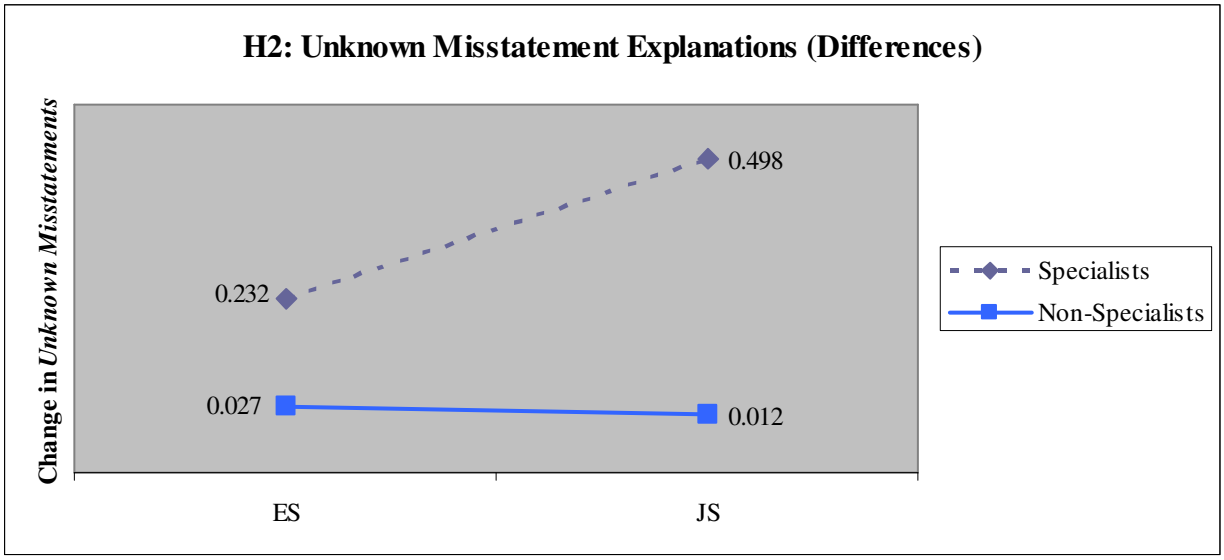


H2 is tested using the contrast: $3*(JS^{S} - C^{S}) - 1/3*(ES^{S} - C^{S} + JS^{NS} + ES^{NS} - 2*C^{NS}) > 0$

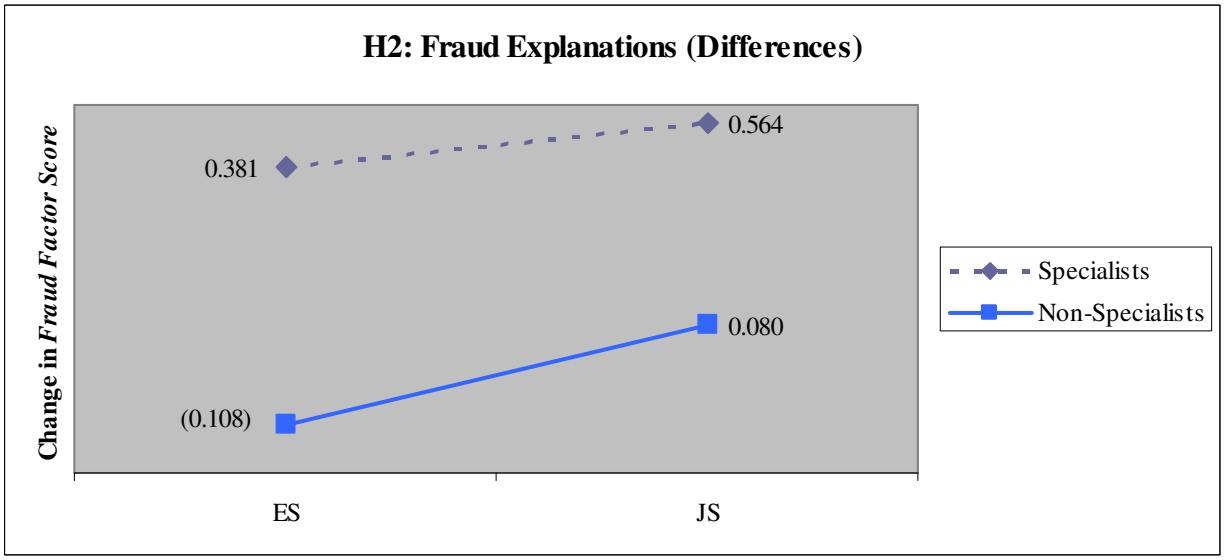
The change on the y-axis refers to the difference from either the specialist or non-specialist *Control* condition. *Specialists*: Participants specializing within the insurance industry; *Non-specialists*: Participants specializing within any other industry; *ES*: Change for participants in the evidence skepticism condition (See Appendix 1 panel A); *JS*: Change for participants in the judgment skepticism condition (See Appendix 1 panel B). *Control*: Participants in the control condition (unprimed).

Figure 4: Graphical Representation of Results

Panel A: Unknown Misstatement Explanations - Differences (Table 2)[a]



Panel B: Fraud Explanations - Differences (Table 3)[a]



a The change on the y-axis refers to the difference from either the specialist or non-specialist *Control* condition. *Specialists*: Participants specializing within the insurance industry; *Non-specialists*: Participants specializing within any other industry; *ES*: Change for participants in the evidence skepticism condition (See Appendix 1 panel A); *JS*: Change for participants in the judgment skepticism condition (See Appendix 1 panel B). *Control*: Participants in the control condition (unprimed).

Table 1: Participant Demographic Information

	Specialists [a]		Non-specialists [a]	
n	n = 58		n = 113	
Experience Level (n)	Partner	5	Partner	4
	Senior Manager	17	Senior Manager	12
	Manager	8	Manager	7
	Senior	26	Senior	84
	Staff	2	Staff	6
Firm Size (n)	Big 4	51	Big 4	106
	Other	7	Other	7
Years of experience				
General	6.67		5.14	
P&C Insurance	3.89		0.26	
L&H Insurance	3.24		0.15	
Other Financial Services	2.60		1.47	
Other Industries	2.92		4.37	
Percent of year:				
P&C Insurance	39.7%		0.9%	
L&H Insurance	37.7%		1.0%	
Other Financial Services	10.1%		25.4%	
Other Industries	12.5%		72.7%	
Experience performing preliminary analytical review (11pt Likert scale):				
P&C Insurance	5.68		0.66	
L&H Insurance	4.95		0.61	
Other Financial Services	4.00		2.96	
Other Industries	4.44		6.84	

a Specialists: Participants specializing within the insurance industry; *Non-specialists*: Participants specializing within any other industry.

Table 2: Unknown Misstatement Explanations

Panel A: Descriptive Statistics [a]

(Mean, Std Dev)	***Specialists***				***Non-Specialists***			
	ES	***Control***	***JS***	***Total***	***ES***	***Control***	***JS***	***Total***
Dependent Variable	***n=20***	***n=19***	***n=19***	***n=58***	***n=37***	***n=42***	***n=34***	***n=113***
Unknown Misstatements	0.99	0.76	1.25	1.00	1.06	1.04	1.05	1.05
	0.63	0.53	0.53	0.59	0.60	0.57	0.56	0.57

Panel B: Analysis of Covariance [b]

Source	SS	df	MS	F	p
Skepticism Target	1.63	2	0.81	2.60	0.077
Specialization	0.24	1	0.24	0.78	0.380
Skepticism Target x Specialization	1.08	2	0.54	1.72	0.183
Misstatement Sensitivity	1.64	1	1.64	5.24	0.023
Non-Specialists' Insurance and Closely-Related Experience	1.33	1	1.33	4.25	0.041
Error	51.03	163	0.31		

Panel C: Planned Comparisons [c]

	Unknown Misstatements	
Contrast	$F_{1,163}$	p
H1: $C^{NS} - C^{S} > 0$	3.26	0.036
H2: $3*(JS^{S} - C^{S}) - 1/3*(ES^{S} - C^{S} + JS^{NS} + ES^{NS} - 2*C^{NS}) > 0$	4.09	0.022

a Specialists: Participants specializing within the insurance industry; *Non-specialists*: Participants specializing within any other industry; *ES*: Participants in the evidence skepticism condition (See Appendix 1 panel A); *Control* : Participants in the control condition (unprimed); *JS*: Participants in the judgment skepticism condition (See Appendix 1 panel B); *Unknown Misstatements:* the total probability assigned to unknown misstatement explanations.

b Specialization (*Specialists* = 0, *Non-Specialists* = 1); *Skepticism Target* (*ES* = 0, *Control* = 1, *JS* = 2); *Misstatement Sensitivity*: reported frequency of misstatements within their industry specialization; *Non-Specialists' Insurance and Closely-Related Experience*: percent of year auditing insurance and other financial services clients * *Specialization*.

c All p-values in Panel C are one-tailed due to a directional prediction.

Table 3: Fraud Explanations

Panel A: Factor Analysis

	Component #1
Number of Fraud Explanations	0.941
Probability of Fraud Explanations	0.941
Eigenvalue	1.770
Percentage of Variance Explained	88.52%

Panel B: Descriptive Statistics [a]

(Mean, Std Dev)	***Specialists***				***Non-Specialists***			
	ES	***Control***	***JS***	***Total***	***ES***	***Control***	***JS***	***Total***
Dependent Variable	***n=20***	***n=19***	***n=19***	***N=58***	***n=37***	***n=42***	***n=34***	***n=113***
Fraud Factor Score	0.06	-0.33	0.14	-0.04	-0.08	0.03	0.11	0.02
	1.39	0.00	1.31	1.11	0.99	0.80	1.07	0.95
Number Fraud Explanations	0.15	0.00	0.21	0.12	0.11	0.21	0.21	0.18
	0.49	0.00	0.54	0.42	0.39	0.47	0.48	0.45
Probability Fraud Explanations	0.07	0.00	0.07	0.05	0.04	0.03	0.06	0.05
	0.28	0.00	0.24	0.21	0.18	0.12	0.19	0.16

Panel C: Analysis of Covariance (Factor Score) [b]

Source	SS	Df	MS	F	P
Specialization	0.58	1	0.58	0.61	0.436
Skepticism Target	3.00	2	1.50	1.59	0.207
Specialization x Skepticism Target	1.85	2	0.92	0.98	0.378
Judgment Fallibility	3.78	1	3.78	4.01	0.047
Overconfidence	11.58	1	11.58	12.28	0.001
Internet	4.98	1	4.98	5.28	0.023
Error	152.83	162	0.94		

Panel D: Planned Comparisons [c, d]

	Fraud Factor Score		*Number Fraud Explanations*		*Probability Fraud Explanations*	
Contrast	$F_{1,162}$	p	$F_{1,162}$	p	$F_{1,162}$	p
H1: $C^{NS} - C^{S} > 0$	2.58	0.055	4.55	0.017	0.77	0.190
H2: $3*(JS^{S} - C^{S}) - 1/3*(ES^{S} - C^{S} + JS^{NS} + ES^{NS} - 2*C^{NS}) > 0$	1.30	0.128	2.05	0.077	0.50	0.240

a Specialists: Participants specializing within the insurance industry; *Non-specialists*: Participants specializing within any other industry; *ES*: Participants in the evidence skepticism condition (See Appendix 1 panel A); *Control* : Participants in the control condition (unprimed); *JS*: Participants in the judgment skepticism condition (See Appendix 1 panel B); *Fraud Factor Score:* factor score from factor analysis in Panel A; *Number of Fraud Explanations*: The number of self-generated fraud explanations; *Probability of Fraud Explanations*: The sum of the probabilities for each self-generated fraud explanation.

b Specialization (*Specialists* = 0, *Non-Specialists* = 1); *Skepticism Target* (*ES* = 0, *Control* = 1, *JS* = 2); *Judgment Fallibility*: reported consideration of judgment fallibility; *Overconfidence* : reported consideration of overconfidence; *Internet:* dummy variable for internet-based participants.

c All p-values in Panel D are one-tailed due to a directional prediction.

d The contrasts for *Number of Fraud Explanations* and *Probability of Fraud Explanations* were run within a repeated measure ANCOVA (not tabulated). Like Panel C, *Judgment Fallibility, Overconfidence* and *Internet* are significant covariates.