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Can Multitasking Influence Professional Skepticism?

ABSTRACT

Motivated by concerns about the adverse effects of multitasking in audit practice and research that highlights the effects of mindset orientation on professional skepticism, we investigate how the performance of tasks consistent with different mindset orientations affects auditors' professional skepticism in a subsequent, unrelated task. Results show that auditors who first complete a task that requires concrete thinking display greater professional skepticism during a subsequent, unrelated task that involves evaluating a narrow and complete set of evidence [a broad and incomplete set of evidence]. We discuss the implications for professional skepticism in multitasking environments.

Key words: Auditors; Mindset; Multitasking; Skepticism; Task sequencing

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1. Introduction

Working on multiple tasks and multiple clients within a short period is a prevailing reality for audit professionals (Bhattacharjee *et al.*, 2013; Westermann *et al.*, 2015; Long and Basoglu, 2016; Mullis and Hatfield, 2018). Bhattacharjee *et al.* (2007, 2013) note that the majority of uninterrupted work periods include work on two or more clients and argue that the complex multitasking audit environment may negatively affect audit professionals' judgment. Indeed, negative consequences of interruptions—which may take the form of being forced to switch between audit tasks (i.e., task switching)—have recently been documented by Kim *et al.* (2017), who find that interrupted auditors assess a lower risk of material misstatement in an account containing unusual fluctuations than do uninterrupted auditors. These authors also highlight the ubiquitous nature of interruptions and point to the scarcity of research on the effect of interruptions on auditors' performance.

Closely related to research on interruptions are studies on the effects of multitasking. Multitasking has been described as a prevalent and growing characteristic of the audit environment (Applebaum *et al.*, 2008; Mullis and Hatfield, 2018). Despite evidence that auditors can hardly avoid multitasking in order to meet client and audit firm demands, research on multitasking and task sequencing remains sporadic. One contributing factor to the patchy stream of audit research in this area may be a lack of clear-cut distinctions between multitasking and related concepts. Thus, a variety of definitions have been proposed (Pashler, 2000; Applebaum *et al.*, 2008; see also Mullis and Hatfield, 2018). For the purposes of the present study, we define multitasking as work fragmentation stemming from recurrent switching between several different activities in line with the notion of task switching (Pashler, 2000; Applebaum *et al.*, 2008).¹

Studies on task switching and multitasking have primarily focused on the effects of performing multiple tasks for a single client or performing similar tasks for multiple clients (e.g., O'Donnell and Schultz, Jr., 2005; Bhattacharjee *et al.*, 2007, 2017). Those studies show that multitasking can lead to undesired carryover effects as well as memory conjunction errors. As high-quality audits cannot be performed in the absence of an appropriate level of professional

¹ See Salvucci *et al.* (2009) for a unified theory of the multitasking continuum, according to which sequential multitasking (including task switching, interruption, and resumption) constitutes one end of the spectrum and concurrent multitasking constitutes the other end.

skepticism² (Nolder and Kadous 2018), the aforementioned risks emanating from a multitasking environment should not be ignored. We further argue that the chances of facing completely unrelated judgment tasks upon transitioning from one client to another are likely to be greater than the prospect of facing highly similar tasks. Therefore, it remains an important open question whether auditors' skepticism is affected when sequential tasks differ in their characteristics *and* relate to different clients. To the best of our knowledge, prior research has not directly investigated multitasking effects on skepticism across completely unrelated judgments.

The purpose of this research is to investigate how the sequential performance of two completely unrelated audit tasks affects auditors' professional skepticism during the second task, even when the second task calls for different judgments and is related to a different client. We propose that auditors' professional skepticism is heightened if the mindset orientation induced by performing a prior audit task (i.e., the task-induced mindset orientation) is compatible with the scope and completeness of audit evidence presented in a subsequent task.

Our focus is on the mindset component of Nolder and Kadous's (2018) dual conceptualization of professional skepticism. Mindset drives cognitive processing and reflects the critical analysis of audit evidence, as required by professional standards (Nolder and Kadous, 2018). As such, our study is motivated by recent calls for research on the consequences for professional skepticism when auditors switch between different mindsets (Backof *et al.* 2016, 2018), triggered by shifting attention from one task to another (i.e., when multitasking). Adequate professional skepticism requires that auditors' mindset orientation matches the characteristics of the task at hand (e.g., Griffith *et al.*, 2016; Backof *et al.*, 2016, 2018), yet mindsets can carry over from one task to another (e.g., Hamilton *et al.*, 2011); thus, a better understanding of the task characteristics that trigger a particular mindset and thus affect professional skepticism during a subsequent task is warranted. Therefore, it is unsurprising that researchers highlight the importance of allocating work so that a sufficiently skeptical mindset is triggered (e.g., Griffith *et al.*, 2015a; Nolder and Kadous, 2018). While Mullis and Hatfield (2018) concede that it is unlikely that auditors can avoid multitasking entirely, they encourage auditors to minimize the need for multitasking through strategic timing of audit tasks. This suggestion aligns with the broader management literature which recommends that grouping

² In line with PCAOB standards, we define professional skepticism as an attitude that includes a questioning mind and a critical assessment of audit evidence (PCAOB, 2012).

activities that require similar mindset orientations may assist in maximizing employee performance (e.g., Hamilton *et al.*, 2011).

Similar to Backof *et al.* (2016, 2018) and Rasso (2015), we draw on construal level theory (CLT) (Liberman and Trope, 1998; Trope and Liberman, 2003) as the basis for our predictions. We predict that auditors who first complete a task consistent with the employment of a concrete mindset, compared with auditors who first complete a task consistent with the employment of an abstract [concrete] mindset, are more skeptical when subsequently rendering judgments about a narrow and complete [broad and incomplete] set of evidence.

To test our predictions, we conduct two experiments with experienced auditors, each using a 2×1 between-subjects design. Reflecting a multitasking environment, each experiment consists of two separate and completely unrelated tasks that auditors must complete successively. The independent variable for both experiments is *task-induced mindset orientation* (abstract vs. concrete), manipulated in Task 1. Task 1 is identical for both experiments and has no relationship to Task 2, which concerns another audit client. We measure professional skepticism in Task 2.

In Experiment 1, we present auditors with a rather narrow, complete set of audit evidence and measure professional skepticism via auditors' assessment of the audit client's ability to collect a customer's accounts receivable balance. In Experiment 2, we provide auditors with audit evidence that is rather broad and incomplete. Specifically, we provide auditors with the results from digital data analysis based on Benford's law (Benford, 1938)³, an analytical procedure. The provided evidence is suggestive of potential problems with the analyzed data due to non-conformance with Benford's law. We capture professional skepticism via auditors' assessment of the likelihood that inventory is materially misstated.

As predicted, the results of Experiment 1 indicate that auditors who first complete an audit task that is consistent with the employment of a concrete mindset display greater professional skepticism during a subsequent, unrelated audit task that involves evaluating a narrow and complete set of audit evidence. The results from our second experiment indicate that

³ Benford's law describes a mathematical phenomenon according to which large sets of authentic (i.e., not manipulated) data, when ordered, should follow a geometric sequence (Nigrini and Mittermaier, 1997). Specifically, Benford's law stipulates the 'expected frequencies for the digits in the various positions (such as the first digit, second digit, and the first-two digits combined) in the numbers in tabulated data' (Nigrini, 2017, p. 30). See Nigrini and Mittermaier (1997) for a listing of expected digital frequencies with respect to the first four positions within a number and a discussion of the underlying statistics. See Nigrini (2017) for a literature review of audit applications of Benford's law.

auditors who first complete an audit task that is consistent with the employment of an abstract mindset display greater professional skepticism during a subsequent, unrelated audit task that involves evaluating a broad and incomplete set of evidence. Our results, taken together, illustrate how the performance of a prior audit task that is entirely unrelated to a subsequent task can prompt a mindset orientation that is either beneficial or detrimental to professional skepticism, depending on the scope and completeness of the evidence evaluated during a subsequent task.

This paper extends the literature on multitasking and auditor mindsets within the context of professional skepticism (Rasso, 2015; Backof *et al.*, 2016; Mullis and Hatfield, 2018). We show that auditors who first complete a task consistent with the employment of an abstract mindset orientation are more skeptical when evaluating broad and incomplete evidence—that is, preliminary and thus somewhat inconclusive (i.e., ambiguous) evidence. In contrast to prior studies, our design eliminates the potential for demand effects and avoids the potential to prompt auditors to process information in an unfamiliar manner (see Frank and Hoffman, 2015). Therefore, our findings highlight the presence of the relatively under-researched priming mechanisms that naturally occur in a multitasking environment and cause processing shifts that affect skepticism on subsequent tasks (see Förster *et al.*, 2004).

We also contribute to the wider accounting literature, as our combined focus on multitasking and decision-makers' mindset orientation suggests possibilities for future research to explore other task-induced mindset implications, which may affect accounting professionals. As Trope *et al.* (2007) note, mindset orientations guide not only evaluations, but also predictions and actions. Thus, initial insights into the consequences of certain audit task characteristics on subsequent judgments, as provided by our study, are important for further investigations into post-evaluative behavior. Given that the effects of abstract versus concrete mindset orientations cannot be equated with deliberative versus implemental mindsets or global versus local processing (Freitas *et al.*, 2004; Tsai and McGill, 2011; Büttner *et al.*, 2014), great care should be taken when the findings reported in accounting studies that draw on other mindset theories are compared with those using the CLT framework.⁴ Accordingly, the present study contributes to the recent and still under-researched stream of audit studies that draw on CLT.

⁴ See Büttner *et al.* (2014) for a detailed discussion on the differences between deliberative versus implemental mindsets and abstract versus concrete mindsets.

This research also has important implications for audit practice. We illustrate that task sequencing can affect professional skepticism in the absence of any meaningful relationship between the earlier task and the latter one. The resulting implications for audit effectiveness and efficiency are of interest to auditors who work in multitasking environments that require frequent shifts in focus because of multiple client or project demands.

The remainder of this manuscript is organized as follows: Section 2 reviews the relevant literature and develops the hypotheses, while Section 3 describes our research method and reports the results from the two experiments. Finally, Section 4 offers the study conclusions and limitations.

2. Literature review and hypotheses development

In a practitioner-oriented literature review, Bhattacharjee *et al.* (2013) cite their earlier findings (see Bhattacharjee *et al.*, 2007) suggesting that auditors address issues pertaining to a single audit client in only 25% of their work sessions. Noting that the majority of uninterrupted work periods (75%) involve work on two or more clients, the authors argue that the complex multi-client, multitasking audit environment may have a profound effect on audit professionals' decision-making, potentially leading to dysfunctional outcomes with respect to audit effectiveness and efficiency. Judgment and decision-making scholars (e.g., Lindberg and Maletta, 2003; O'Donnell and Schultz, Jr., 2005; Bhattacharjee *et al.*, 2007, 2017) have investigated those concerns and identified undesirable carryover effects as a common form of information-processing and recall-related errors.

Carryover effects occur when auditors subconsciously allow information obtained from work on a prior task or audit client to influence their judgment on a current task or audit client (Bhattacharjee *et al.*, 2013). With a focus on performing multiple tasks for a single client, O'Donnell and Schultz, Jr. (2005) illustrate how strategic risk assessment affects auditors' sensitivity toward account-level fluctuations that are inconsistent with their holistic evaluation of their client's business model. Auditors who perform strategic risk assessment, compared with those who do not perform such analysis, display greater tolerance for inconsistent account-level fluctuations in their assessment of account-level risk. Complementing O'Donnell and Schultz, Jr.'s (2005) investigation of judgment effects resulting from the performance of multiple tasks for a single client is research on judgment effects stemming from the performance of similar tasks for multiple clients. For example, Lindberg and Maletta (2003) and Grossman and Welker

(2011) document how auditors commit memory conjunction errors when their multitasking involves more than one audit client. According to Lindberg and Maletta (2003), memory conjunction errors transpire when memory bits related to one situation are improperly associated with another situation during the memory reconstruction process. In the assurance context, auditors may associate audit evidence obtained from one client to another audit client, thereby negatively affecting audit effectiveness or efficiency, depending on the valence of the evidence. Lindberg and Maletta's (2003) experiment indicates that the likelihood of committing memory conjunction errors is a complex function of the relationship between the memory trace and its origin, its target for memory reconstruction purposes, and audit risk.

Grossman and Welker (2011) extend this research by showing that auditors' propensity to commit memory conjunction errors is higher when audit evidence is arranged in a causal sequence rather than in a traditional working paper order or random order. However, Bhattacharjee *et al.* (2007, 2017) find that even when memory bits are attributed to the proper client, judgment errors may occur as a result of contrast effects. Specifically, the researchers show that auditors, upon exposure to comparable judgment information, base their assessment of a current client's information on a comparison of the former with similar information related to a prior client. This finding is consistent with psychology research which shows that in situations involving sequential judgments within a specific domain, antecedent judgment tasks establish a prime against which information pertaining to the subsequent judgment task may be compared (Bhattacharjee *et al.*, 2007).

In a more recent study, Mullis and Hatfield (2018) provide evidence that multitasking reduces auditors' ability to identify seeded errors—particularly conceptual errors, as opposed to mechanical errors. The authors attributed the detected decline in auditors' judgment quality to ego depletion (i.e., the depletion of self-control resources) resulting from multitasking. Multitasking necessitates that auditors engage in self-control to retain cognitive focus and suppress their desire for closure (see Webster and Kruglanski, 1994; Metcalfe and Mischel, 1999; Mullis and Hatfield, 2018). Based on these insights, the authors also illustrate the effectiveness of an ego-boosting intervention that replenishes auditors' depleted self-control resources (Mullis and Hatfield, 2018). It is worth noting that, in contrast to the studies discussed above, Mullis and Hatfield (2018) narrowly define multitasking as switching back and forth between tasks without completing either task prior to moving on to a subsequent task.

Together, these studies provide converging evidence that working on multiple tasks and multiple clients within a short period affects auditors' judgments. However, the implications of such work environments on auditors' professional skepticism in situations in which sequential tasks are neither related to the same client nor related in terms of domain-specific information, have received little attention. We argue that the investigation of such situations, which are arguably more commonplace, calls for attention to auditors' overall mindset orientation as induced by performing an earlier task. The underlying reason for our argument is that the broader explanatory power of the theoretical predictions related to overall mindset orientation (Trope, 2004; Weisner, 2015) seems more suitable to address the diverse set of possible sequencing scenarios when auditors switch from one task to another.

To this end, we draw on the same psychology framework as related studies that, on the surface, provide contradictory evidence with respect to the 'ideal' mindset orientation for enhancing professional skepticism. Research by Backof *et al.* (2018) indicates that auditors who have adopted a concrete mindset orientation, compared with their counterparts who have adopted an abstract mindset orientation, display greater professional skepticism when assessing the reasonableness of a complete set of management assumptions in the context of complex fair value estimates. The authors provide evidence that auditors who have been primed to adopt a concrete mindset orientation by considering *how* management arrived at a specific assumption are more likely to curb aggressive reporting. Backof *et al.* (2018) explained that a concrete mindset orientation increases auditors' sensitivity to critical contradictory evidence when assessing individual assumptions. However, another study by Backof and colleagues suggests that abstract thinking, rather than concrete thinking, leads to judgments that are more skeptical. Backof *et al.* (2016, p. 6) show that priming auditors to adopt an abstract mindset orientation by considering 'why the transaction should be accounted for in accordance with the non-client-preferred accounting method' enhances auditors' professional skepticism in a setting that calls for consideration of various alternatives and thus benefits from big-picture thinking. The authors reconcile those findings by highlighting that the nature of the audit task at hand needs to be critically evaluated to determine the ideal mindset orientation for promoting professional skepticism. Rasso (2015) shares Backof *et al.*'s (2016) conclusion that the scope of the judgment task determines whether an abstract or concrete mindset orientation enhances skepticism. Rasso (2015) also employs the context of complex estimates and indicates that auditors who follow

documentation instructions that promote an abstract mindset orientation are better able to assimilate a broad set of incomplete evidence (i.e., a subset of the available audit evidence) and thus display greater skepticism. The author argues that, in the context of complex estimates, the nature and completeness of the audit evidence under evaluation ultimately determines whether an abstract or concrete mindset orientation enhances professional skepticism. The conclusions drawn by Rasso (2015) and Backof *et al.* (2016) are consistent with findings from basic psychology research that indicate that appropriate matching of construal mindset orientation (i.e., abstract vs. concrete thinking) with task characteristics facilitates processing accuracy, which should translate (in an audit setting) to greater professional skepticism (e.g., Bar-Anan *et al.*, 2006; Kim *et al.*, 2009).

It is important to note that the aforementioned studies relied on psychology-based interventions and judgment frameworks (see Tegeler, 2018) designed to induce an abstract or concrete mindset orientation.⁵ In essence, the interventions and judgment frameworks contain features that psychology research has shown to be effective in switching mindsets. More precisely, interventions or judgment frameworks designed to induce a concrete mindset orientation will either cause participants to maintain a concrete mindset orientation (if this is their current mindset orientation) or cause participants to switch from an abstract to a concrete mindset orientation (or vice versa). Moreover, as mindsets are sticky (e.g., Hamilton *et al.* 2011), the mindset induced by the psychology-based interventions and judgment frameworks employed by Backof and colleagues as well as by Rasso (2015), carried over to the task auditors were subsequently challenged with.

Psychology studies indicate that myriad diverse tasks can prompt participants to adopt a concrete or abstract mindset orientation and subsequently affect participants' judgment, even when the manipulation task is entirely unrelated to the situation being evaluated.⁶ The variety of

⁵ As the aforementioned, CLT-based studies do not capture participants' mindset orientation prior to commencing the experiment, it is not possible to decide whether the interventions or judgment frameworks led participants to merely maintain their prior mindset or if a switch in mindset orientation has indeed occurred.

⁶ For example, Wakslak and Trope (2009, p. 55-56) manipulated construal level via a task in which participants compared products with either alignable attributes (concrete condition) or nonalignable attributes (abstract condition); a categorization task that prompted participants to either identify a superordinate category (abstract condition) or a subordinate example (concrete condition) for each emphasized word on the experimental instrument; a priming task that prompted participants in the abstract [concrete] condition to link a described activity 'to increasingly abstract goals by answering a series of "why?" questions' ['to increasingly concrete activities by answering a series of "how?" questions']; Navon's (1977) task in which participants were asked to either identify the large letters (abstract condition) or small letters (concrete condition) of 'a series of large letters, each of which

mindset manipulations illustrated in the psychology literature suggests that other tasks that may occur more naturally in a work environment could similarly affect overall mindset orientation and hence affect subsequent judgments. More precisely, it seems reasonable to assume that audit tasks containing features that closely resemble psychology-based, mindset-inducing interventions can similarly cause a switch in mindset orientation which remains ‘sticky’ and carries over to a subsequent task that lacks identified mindset-inducing characteristics (i.e., a subsequent task that does not cause a switch in mindset orientation).

Thus, consistent with Nolder and Kadous (2018), who conceptualize mindset as an inherent component of professional skepticism, we argue that audit task-induced mindset orientation will subsequently affect auditors’ skeptical judgment during an unrelated audit task as follows: auditors who have adopted a concrete mindset will be more skeptical when evaluating a complete set of audit evidence on a standalone basis (e.g., Backof *et al.*, 2018), as long as the evidence under consideration is relatively narrow in scope (e.g., Rasso, 2015). By definition, in such a scenario, auditors would be less preoccupied with contemplating whether the accumulated evidence is sufficient and can direct their attention to the details of the evidence. Considering the details in a self-contained information set is facilitated by concrete thinking (Henderson *et al.*, 2006).

In contrast, auditors who have adopted an abstract mindset will be more skeptical when evaluating audit evidence that is inherently broad and incomplete, and hence inconclusive. In such a scenario, auditors would be forced to consider a variety of possible explanations, defer judgment, and remain more skeptical. This reasoning is not only consistent with Plumlee *et al.* (2015) and Rasso (2015), but also with CLT studies that indicate that abstract thinking facilitates the consideration of alternatives (e.g., Liberman and Trope, 2008; Trope and Liberman, 2010). Given prior multitasking research and using CLT, we hypothesize the following:

H1: When completing a task characterized by a narrow and complete evidence set [broad and incomplete evidence set], greater levels of skepticism will be exercised by auditors who first complete a task consistent with the employment of a concrete mindset rather than a task consistent with the employment of an abstract [concrete] mindset.

was composed of repetitions of a given small letter’; and a hierarchical shape task that required participants to circle either each large shape (abstract condition) or each small shape (concrete condition) in ‘a series of large shapes made up of smaller shapes’.

3. Research method

To test our hypotheses, we conduct two experiments each using a 2×1 between-subjects design. Both experiments, Experiment 1 and Experiment 2, incorporate two unrelated decision tasks: Task 1 and Task 2. Task 1 was identical for Experiment 1 and Experiment 2. Task 2 differed between Experiment 1 and Experiment 2. Upon completing Task 2, participants in both experiments responded to various debriefing and demographic questions before submitting their responses (see respective subsections). For both experiments, our personal contacts – firm partners – helped us recruit experienced auditors at their firms with a minimum of two years of audit experience. The paper-based experimental materials were randomly distributed via our contacts and mailed back to one of the researchers. The independent variable for both experiments is task-induced mindset orientation (abstract vs. concrete), manipulated in Task 1 and described in the next section.⁷

3.1 Experiment 1

Participants

We recruited 26 experienced auditors to complete the experimental material. The participants' mean age was 33.0 years and mean years of audit experience was 9.8 years. The sample consists of 16 male (61.5%) and 10 female (38.5%) auditors. Sixteen auditors (61.5%) indicated that they worked for a Big 4 audit firm, nine auditors (34.6%) indicated that they worked for a regional audit firm, and one auditor (3.8%) indicated working for a local firm. Half of our participants (50.0%) held a position of audit manager or above (seven managers, two directors, and four partners). With respect to education, 11 participants (42.3%) declared that a bachelor's degree was the highest level of education attained and 15 auditors (57.7%) had attained a master's degree (untabulated). Most participants (88.5%) were licensed certified public accountants (CPAs). No significant differences with respect to any of the demographic measures (age, years of audit experience, gender, position, education, and professional licenses) existed across experimental conditions (all p -values > 0.05 , two-tailed).

⁷ Hurtt (2010) conceptualizes professional skepticism as an individual characteristic that can manifest as either a 'state' or a 'trait' (see also Quadackers *et al.*, 2014; Cohen *et al.*, 2017). While state skepticism reflects 'a temporary condition aroused by situational variables', trait skepticism reflects 'a relatively stable, enduring aspect of an individual' (Hurtt, 2010, p. 149). Based on these definitions, our manipulation of task characteristics constitutes a manipulation of situational variables that affect state skepticism.

Independent variable manipulation (Task 1)

We manipulate mindset orientation in Task 1 by asking auditors to conduct a plausible audit task that requires either a high-level, abstract perspective or a low-level, concrete perspective. Each task is related to fraud risk assessment. Recent literature on fraud risk assessment (see Wilks and Zimbelman, 2004b; Favere-Marchesi, 2013; Simon *et al.*, 2018) finds beneficial effects from decomposing fraud risk assessments⁸ and suggests the possibility that auditors who decompose their assessments first engage in *categorization* to reduce cognitive load (Favere-Marchesi, 2013).

While present PCAOB standards do not require auditors to categorize fraud risks into one of the three categories identified by AU Section 316 (SAS 99) (PCAOB, 2002) (i.e., incentives/pressures, opportunities, attitudes/rationalizations), Favere-Marchesi (2013, p. 203) argues that ‘categorization is a reasonable first step in auditors’ fraud-risk assessments’. With reference to psychology research, he further explains that the inclination to categorize is a ubiquitous facet of human thought and a natural response to decision makers’ limited information-processing capacity, as categorization is critical for problem solving and reasoning.

CLT research adds to this literature by indicating that the association between psychological distance and construal level has critical implications for categorization (Liberian and Trope, 2008). A firmly established finding within the CLT literature is that broad categorization is associated with abstract construal (e.g., Liberman *et al.*, 2002; Fujita *et al.*, 2006; Smith and Trope, 2006; Wakslak and Trope, 2009). Given that Wakslak and Trope (2009) suggest that tasks requiring the grouping of objects into broad categories prompt an abstract mindset and that, within the accounting literature, Wilks and Zimbelman (2004a, p. 177) note that ‘categorization may help auditors think more broadly’, the current study uses a categorization task involving three broad categories to induce an abstract mindset orientation.⁹

The *abstract mindset* orientation condition of Task 1 requires participants to categorize a randomly ordered listing of 40 statements about a hypothetical audit client (‘Wittim’) into three broad fraud risk factor categories (incentives/pressures, opportunities, and attitudes/rationalizations). Specifically, participants were asked to ‘consider carefully the

⁸ That is, individually assessing the risk stemming from management attitudes, opportunities, and incentives prior to rendering a judgment about the overall fraud risk.

⁹ While an abstract mindset can also be triggered by responding to a series of ‘why’ questions, we chose a naturally occurring task type (categorization) that has received little attention from accounting researchers, despite being well established in the CLT literature.

implications of each statement and assign each statement to one of the above-listed categories'. Each statement is modeled after one of the fraud risk factors identified by AU Section 316. The participants read a brief client description adopted from Morrill *et al.* (2012) (introductory paragraph only) and were informed that a member of their audit team compiled the 40 statements about Wittim. Twenty-eight of those statements indicate the presence of a risk while the remaining 12 statements (four within each fraud risk category) do not suggest heightened risk. The latter statements were constructed by negating the wording of various AU Section 316 statements, and serve a twofold purpose. First, their inclusion renders the task slightly more difficult, which should prompt auditors to devote more thought to the task. Second, their inclusion should lead to a more balanced assessment of fraud risk factors related to the client (rather than an assessment that may be considered excessively negative). The case material was designed to contain information similar to that which would be used by experienced auditors in rendering a fraud risk assessment during the planning phase of the audit. The fraud risk category definitions included in the experimental material were adopted from Wilks and Zimbelman (2004b). Appendix A illustrates the 40 statements.

The participants in the *concrete mindset* orientation condition received identical background information, fraud risk category definitions, and statements about Wittim. However, in contrast to the abstract mindset orientation condition, the same 40 statements were already grouped according to the three fraud risk factor categories. Rather than categorizing the statements, participants were instructed to 'consider carefully *how* the information contained in each statement affects [their] assessment of risk related to the respective risk category'. Differently stated, the participants were asked to evaluate the significance of the fraud risk factors. The participants responded to category-specific questions about how they perceived each statement to affect the risk of misstatements arising from fraudulent financial reporting. The answers were captured on a five-point Likert scale anchored at 1 ('substantially decreases') and 5 ('substantially increases'). The reason for capturing responses on a five-point Likert scale, rather than merely asking whether each statement indicated heightened risk or not, is that the former method is considered more suitable for prompting participants to devote more thought to each statement (as would likely be required in an actual audit).

While the *how* questions do not strictly prompt the consideration of a *process* (as in Wakslak and Trope, 2009), they are somewhat similar to such consideration in that they require

sequential reasoning. The participants needed to evaluate each statement with respect to its impact (if any) on the risk of misstatement arising from fraudulent financial reporting attributable to the *specific* risk category. Given that Malkoc *et al.* (2010) argue that a concrete mindset is the default mindset and that our participants were not encouraged to think in terms of higher-level categories (that is, to group risk factors), we contend that this task would promote or at least sustain a concrete mindset orientation. This conclusion seems reasonable as findings by Rasso (2015, p. 53) also suggest that ‘auditors in practice collect and process information with low-level construals’.

Note that both conditions of the mindset manipulation task require auditors to render 40 decisions in the domain of fraud risk assessment (Task 1; fraud risk assessment task). The 40 statements, which are based on fraud risk factors identified in AU Section 316 (SAS 99), and were modified to describe a hypothetical audit client, are identical for both mindset manipulation conditions. Aside from requiring an equal number of decisions, the conditions were expected to require a similar amount of effort. The perceived difficulty associated with Task 1 was captured in the debriefing questions (discussed below). Task 1 is related to client Wittim and has no relationship to Task 2.¹⁰

Experimental Task 2 and dependent variable

Task 2 consists of a vignette adapted from Joyce and Biddle (1981; Experiment 3a) and asks participants to estimate the probability that the accounts receivable balance owed to an audit client (‘Premier Electro Tech’) by a single customer would be collectible. The participants are informed that their review of an audit client’s allowance for uncollectible receivables reveals that a very large account (material to the audit) is six months past due from a single customer who has provided a positive confirmation that the balance is correct. The participants are further informed that, based on their past ‘experience with Premier Electro Tech, the company has been able to collect receivables that are 6 months past due about half of the time’. The case scenario

¹⁰ While we acknowledge that a wide variety of task characteristics could potentially trigger the adoption of a concrete or abstract mindset, it remains to a large extent an empirical question what those task characteristics are. As such, we cannot rule out that either one or both versions of Task 2 contains features that may trigger either a concrete or abstract mindset. However, concluding that Task 2 contains features that render this task mindset-inducing would be highly speculative. Moreover, even if Task 2 could be considered mindset-inducing, the likelihood that auditors would switch mindset again upon commencement of Task 2 seems rather low. The reason for this is that repeated switching of mindsets, particularly within a short period of time, has been shown to be a daunting task (Steinbach *et al.* 2019; see also Trope and Liberman, 2010 who note that even a single construal shift is challenging for executives).

continues by explaining that the audit client's controller believes that the entire amount will be recoverable. Additionally, the audit client's credit manager clarifies that, although the customer's 'average payment time on accounts receivable has steadily increased', the delay in payment is attributable to an inadequate accounting system (which is currently being replaced), rather than problems with generating cash flows. As such, the instrument contains several indications that suggest that the auditor nears completion of the substantive evidence-gathering process: an aging schedule has been prepared during the review of the adequacy of the allowance for uncollectible accounts, a positive confirmation has been received from the customer, and a response from the client's credit manager has been obtained during further investigations. The limited and fairly complete set of evidential clues renders the present judgment task to be rather narrow in scope, which implies that a concrete mindset orientation should enhance skepticism (Rasso, 2015; Backof *et al.*, 2016). Appendix B illustrates the case scenario for Task 2 of Experiment 1.

To measure auditors' skeptical judgment, we ask our participants to estimate the probability that the accounts receivable balance owed to Premier Electro Tech will be collectible. Specifically, auditors responded to the question: 'Based on the above information, what is your estimate of the probability that the receivable will be collected in full next year?' The participants responded on a scale ranging from a minimum probability of zero to a maximum of one, with 5% increments. We expect a negative relationship between professional skepticism and participants' estimate of the probability that the receivable was fully collectible (i.e., selecting a lower probability offered evidence of greater professional skepticism). These expectations are consistent with Nelson (2009) and Hurtt (2010), who explain that researchers consider an auditor to be more skeptical when the auditor doubts the accuracy of managements' estimates because of the lack of more persuasive evidence (Tegeler, 2018).

Debriefing questions

A debriefing question enquired about the perceived difficulty of the fraud risk factor task. Responses were provided on a five-point Likert scale anchored at 1 ('very easy') and 5 ('very difficult'). Overall, auditors judged the fraud risk factor task to be neither easy nor difficult (mean = 3.08, SD = 0.70). Difficulty assessments did not significantly differ ($p = .931$, two-tailed) across the abstract and concrete conditions (mean = 3.07 and 3.09, respectively), thereby suggesting that the abstract version of Task 1 was considered as difficult as the concrete version of Task 1. We also asked participants to indicate whether they had experience with rendering a

probability assessment similar to the one described in the experimental material. Answers were captured in yes/no format. All auditors indicated such experience, except for one participant who skipped this question.

Results

H1 predicts that auditors who have first completed a task consistent with the employment of a concrete mindset, compared with auditors who have first completed a task consistent with the employment of an abstract mindset, display greater professional skepticism when evaluating a narrow and complete set of audit evidence. To test H1, we conducted a *t*-test comparing the mean probabilities assessed by participants in the ‘concrete mindset’ condition with those of the ‘abstract mindset’ condition. The results shown in Table 1 reveal that, on average, auditors in the concrete mindset condition assessed a lower probability that the accounts receivable would be collectible (mean = .51, SD = .23) than did auditors in the abstract mindset condition (mean = .68, SD = .22). This difference is significant ($t_{24} = 1.92, p = .034$, one-tailed). We interpret the display of lower confidence in the collectability of accounts receivable as reflecting increased professional skepticism. Therefore, our results from Experiment 1 support our hypothesis.

[INSERT TABLE 1 HERE]

3.2 Experiment 2

Participants

We recruited 35 experienced auditors for Experiment 2. The participants’ mean age was 32.7 years and mean years of audit experience was 8.0 years. The sample consists of 28 male (80.0%) and seven female (20.0%) auditors. Twenty auditors (57.1%) indicated that they worked for a Big 4 audit firm, three auditors (8.6%) indicated that they worked for a national audit firm, 11 auditors (31.4%) indicated that they worked for a regional audit firm and one auditor (2.9%) indicated working for a local firm. More than half of our participants (54.3%) held a position of manager or above.¹¹ With respect to education, 11 participants (31.4%) declared a bachelor’s degree as the highest level of education attained and 24 auditors (68.6%) had attained a master’s degree (untabulated). Most participants (88.6%) were licensed CPAs. No significant differences with respect to most of the demographic measures (age, years of audit experience, gender,

¹¹ Percentage based on $n = 33$, since two participants did not provide position information.

education, and professional licenses) exist across experimental conditions (all p -values > 0.05 , two-tailed). Only demographic variable *position* differs across conditions ($p = 0.047$, two-tailed).

Experimental Task 2 and dependent variable

In Experiment 2, the participants read a case scenario that briefly described the operations of a hypothetical automotive electronics supplier ('JRO Inc.'). The participants are asked to assume that they 'are the audit team member in charge of planning audit procedures related to JRO's inventory'. The participants are further informed that their audit firm encourages the use of audit analytics tools, particularly digital analysis based on Benford's law. To establish the appropriateness of a digital analysis, the participants are told that JRO's inventory comprises 'a wide range of products, with great differences in value and extremely different quantities of stock' (CaseWare IDEA 2007, p. 28) and that it was determined (by the participants) 'that the values of the inventory should follow the natural distribution of Benford's Law' (CaseWare IDEA, 2007). The case scenario then describes that the participants had requested (from their firm's data analytics team) a first-digit analysis of JRO's inventory data, since 'a high-level first-digit test on the total inventory value associated with each item in stock' was considered 'an appropriate first step for determining the *overall* reasonableness of the inventory data'. The participants were then presented with the results of the requested first-digit analysis, which were presented in graphical form.¹² The mean absolute deviation of the underlying data for the presented graph was 2.64, and thus clearly reflective of nonconforming data. Accordingly, it can be argued that auditors who are more skeptical in their judgment of the underlying data render indeed more prudent judgments.¹³ Appendix C illustrates the case scenario for Task 2 of Experiment 2.

When confronted with audit evidence from analytical procedures during the planning phase of an audit, an auditor should be aware of the inconclusiveness of the evidence. Analytical procedures are inherently ambiguous (Abdolmohammadi and Wright, 1987) and similar to creative problem-solving tasks (Plumlee *et al.*, 2015) during which an abstract mindset orientation improves performance (e.g., Förster *et al.*, 2004; Jia *et al.*, 2009; Polman and Emich,

¹² Our choice of presenting auditors with a graph rather than a verbal description of the results from Benford's analysis biases against finding results, as prior research shows that individuals' ability to detect deviations from the overall trend in the underlying data is facilitated by concrete thinking (Henderson *et al.*, 2006; Backof *et al.*, 2018).

¹³ Mean absolute deviation (MAD) is a common measure of goodness-of-fit with Benford's law. An MAD greater than 0.015 suggests nonconformity (Nigrini, 2012).

2011). Given that multiple factors could potentially explain the outcome of analytical procedures, auditors are forced to contemplate a variety of possible explanations (similar to searching for an answer to a ‘why’ question), defer judgment and remain more skeptical (see Plumlee *et al.*, 2015; Rasso, 2015). Our case scenario contains several pieces of information that indicate that the audit was in the planning phase and that the evidence under evaluation constitutes preliminary, and hence incomplete evidence. As such, the participants should be alerted to the fact that a variety of additional evidence will need to be collected and that the available preliminary evidence is merely part of a broader set of evidence. Moreover, given that the scenario suggests that the analysis prepared by the data analytics team is adequate for ‘determining the *overall* reasonableness’ (emphasis in original instrument), the participants are implicitly encouraged to take a ‘big-picture’ perspective.

We use three measures to capture auditors’ professional skepticism. The three measures require participants to answer questions on a seven-point Likert scale anchored at 1 (‘very unlikely’) and 7 (‘very likely’). Those questions are as follows: (1) ‘Overall, how would you assess the likelihood that inventory is materially misstated?’ (cf. Quadackers *et al.*, 2014); (2) ‘How would you assess the likelihood that inventory is materially misstated due to fraud?’ (cf. Knapp and Knapp, 2001; Carpenter and Reimers, 2013; Quadackers *et al.*, 2014); and (3) ‘How would you assess the likelihood that inventory is materially misstated due to error?’ (cf. Quadackers *et al.*, 2014). We expect a positive relationship between professional skepticism and participants’ likelihood assessment (i.e., selecting a higher likelihood offered evidence of greater professional skepticism).

Debriefing questions

A debriefing question enquires about the perceived difficulty of the fraud risk factor task. Responses are provided on a five-point Likert scale anchored at 1 (‘very easy’) and 5 (‘very difficult’). Overall, auditors judged the fraud risk factor task to be neither easy nor difficult (mean = 2.86, SD = 0.90). Difficulty assessments did not significantly differ ($p = .348$, two-tailed) between the abstract and concrete conditions (mean = 3.04 and 2.74, respectively), thereby suggesting that the abstract version of Task 1 was considered as difficult as the concrete version of Task 1. The participants were also asked to indicate whether they had ever ‘served as a member of an audit team which utilized data analytics during either stage of an integrated financial statement audit’ and whether they had ‘ever used digital analysis based on Benford’s

Law to analyze the authenticity of client information'. Answers to both questions were captured in a yes/no format. Twenty-three auditors (65.7%) responded 'yes' to the first question, while only three auditors (8.6%) indicated having experience using Benford's analysis.¹⁴ The low number of 'yes' responses to the second question was expected, since anecdotal evidence suggests that financial statement auditors do not conduct Benford's analysis themselves, but rather receive data analytics results from their firm's data analytics team.

Results

H1 predicts that auditors who had first completed a task consistent with the employment of an abstract mindset, compared with auditors who have who had first completed a task consistent with the employment of a concrete mindset, display greater professional skepticism when evaluating a broad and incomplete set of audit evidence. To test our hypothesis, we conduct *t*-tests comparing the mean responses provided by participants in the 'concrete mindset' condition with those of the 'abstract mindset' condition. The results shown in Table 2 reveal that, on average, auditors in the concrete mindset condition assessed a lower likelihood that inventory was materially misstated (mean = 3.38, SD = 1.46) than did auditors in the abstract mindset condition (mean = 4.07, SD = 1.14). The mean difference is marginally significant ($t_{33} = 1.49, p = .074$, one-tailed).

Our second dependent variable captures auditors' perceived likelihood that inventory is materially misstated due to fraud. Similar to our results for the first dependent variable, auditors in the concrete mindset condition assessed a lower likelihood that inventory is materially misstated due to fraud (mean = 3.10, SD = 1.26) than did auditors in the abstract mindset condition (mean = 3.43, SD = .94). The difference is not significant ($t_{33} = .84, p = .203$, one-tailed). Our third dependent variable captures auditors' perceived likelihood that inventory is materially misstated due to error. Auditors in the concrete mindset condition assessed a lower likelihood that inventory is materially misstated due to error (mean = 3.71, SD = 1.27) than did auditors in the abstract mindset condition (mean = 4.29, SD = .73). This difference is significant ($t_{32.43} = 1.69, p = .050$, one-tailed). Thus, in particular, the result of this dependent variable that addressed auditors' concern with material misstatement due to error supports our hypothesis, as a higher perceived likelihood that inventory is misstated reflected increased skepticism.

¹⁴ The participants' answers did not significantly differ across conditions ($p = .398$, two-tailed and $p = .812$, two-tailed, respectively).

Importantly, given that the mean absolute deviation of the underlying data for the presented graph suggests that the first-digit analysis does not conform to Benford's law, a more skeptical judgment could be interpreted as more adequate.

[INSERT TABLE 2 HERE]

To further investigate the effect of mindset on auditors' professional skepticism, we measure the extent to which participants feel the need to modify budgeted audit hours related to inventory testing. After collecting responses for our three dependent variables that capture skeptical judgment in Experiment 2, we asked participants to complete the sentence: 'Based on the results of the Benford's Analysis, budgeted audit hours allocated to inventory testing should be _____ (please indicate your choice)'. They responded on a seven-point Likert scale anchored at 1 ('substantially decreased') and 7 ('substantially increased'). As such, this question is closely related to measures of the 'number of budgeted audit hours'—a commonly used proxy for *skeptical action* (Quadackers *et al.*, 2014; Weisner and Sutton, 2015). While we would anticipate a positive relationship between professional skepticism and participants' indication that audit hours should be increased, the measure was not significantly influenced by our independent variable ($p = .838$, two-tailed).

Our measure of audit hour modification is significantly correlated with our first dependent variable (likelihood that inventory was materially misstated) (Pearson's $r = .42$, $p = .012$, two-tailed). The measure is marginally significantly correlated with our second dependent variable (materially misstated due to fraud) (Pearson's $r = .31$, $p = .066$, two-tailed) and third dependent variable (materially misstated due to error) (Pearson's $r = .30$, $p = .080$, two-tailed). However, these findings are unsurprising, as research by Glover *et al.* (2000) suggests that experienced auditors allocate additional, costly audit hours only when they find limited 'corroborating evidence supporting the client's non-error explanation' and auditors believe that the client has a clear incentive to misstate (Nelson, 2009, p. 8). Our case scenario is void of any indication that the client would have an incentive to misstate. Moreover, the scenario describes that the client had received unqualified audit opinions for the previous six years and that no material internal control weakness was ever detected by the auditor.

4. Conclusion

In this study, we investigate how the performance of auditing tasks that are consistent with the employment of either a concrete or an abstract mindset affects auditors' professional skepticism during a subsequent, completely unrelated task (i.e., dissimilar task and different audit client). As such, we respond to recent calls for research on the relationship between auditors' mindset orientation and professional skepticism (Frank and Hoffman, 2015; Rasso, 2015; Backof *et al.*, 2016) and address some of those studies' inherent limitations. Moreover, through a focus on the effects of task-induced mindset on auditors' skepticism in a multi-task/multi-client environment, the study follows Bhattacharjee *et al.*'s (2007) earlier call for additional research on situations in which auditors render sequential judgments about diverse targets.

The results from our first experiment indicate that auditors who first complete an audit task that is consistent with the employment of a concrete mindset display greater professional skepticism during a subsequent, unrelated audit task that involves evaluating a narrow and complete set of audit evidence. The results from our second experiment indicate that auditors who first complete an audit task that is consistent with the employment of an abstract mindset display greater professional skepticism during a subsequent, unrelated audit task that involves evaluating a broad and incomplete set of evidence.

Our results complement findings from a recent stream of audit research that investigates how psychology-based interventions and judgment frameworks can help auditors adopt the appropriate mindset orientation when auditing fair value estimates. This research stream shows that prompting a concrete mindset orientation renders auditors more skeptical when the audit task at hand has a detailed, specific focus (Backof *et al.*, 2018), while prompting an abstract mindset orientation elicits greater skepticism when the audit task at hand requires a broader focus (Rasso, 2015; Backof *et al.*, 2016). The overall conclusion from those studies is that the scope of the judgment task (i.e., narrow focus vs. more holistic evaluation) determines whether an abstract or concrete mindset orientation enhances skepticism—at least in the context of rather complex judgments (Rasso, 2015).

In contrast to the aforementioned studies, our research does not rely on psychology-based interventions and judgment frameworks (see also Tegeler, 2018); rather, our study investigates how the type of thinking required for the performance of an unrelated prior task affects auditors'

professional skepticism during a subsequent task.¹⁵ Thus, while Backof *et al.* (2016, p. 10) conclude that ‘it is critical to consider the audit task at hand when determining how best to restructure a given audit task to induce the most beneficial “level” of thinking on the continuum from concrete, low-level details to abstract, high-level essences’, our study indicates that consideration of preceding tasks is similarly important.

Our research also differs in two other critical aspects from earlier studies. First, our two experimental settings differ from both Rasso (2015) and Backof *et al.* (2018), who ask auditors to evaluate evidence related to management-provided evidence concerning fair value estimates. We provide evidence that mindset orientation affects professional skepticism in fairly routine audit decisions (e.g., judgments related to the collectability of accounts receivable in Experiment 1, and judgments concerning trend deviations in Experiment 2) and not only in situations involving complex issues (i.e., judgments related to fair value estimates) (see Griffith *et al.*, 2015b; Rasso, 2015; Backof *et al.*, 2018). As such, our findings confirm Nolder and Kadous’s (2018) assessment that mindset is a critical and inherently present component of professional skepticism, irrespective of task difficulty.

While it is challenging to provide direct evidence of mindsets, it is worth noting that drawing on mindset theory (Gollwitzer, 1990; Gollwitzer *et al.*, 1990) suggests that a deliberative (or assessment) mindset would yield a lower task–mindset fit for the mundane audit tasks provided in our experiments (see Griffith *et al.*, 2015b, who caution against adopting a deliberative mindset for routine processing tasks). Thus, from the perspective of mindset theory, the adoption of an implemental mindset would have led to judgments that were consistently (i.e., across both experiments) more skeptical for individuals who first completed a task consistent with the employment of a concrete mindset (due to better task–mindset fit). The reason for this is that consideration of ‘how’ aspects related to the fraud risk factor assessment task (i.e., our concrete mindset version of Task 1) overlaps with manipulations used to induce an implemental mindset.¹⁶

Second, we demonstrate that the scope of evidence and the related need to assimilate information from various sources is not necessarily the only criterion that determines whether a

¹⁵ We are unaware of any theoretical reasons why our results would have differed if the preceding task had been related to the subsequent task (e.g., same client). However, by selecting a completely unrelated task, our results are more generalizable.

¹⁶ See Griffith *et al.* (2015b, p. 59), who instructed participants in the implemental mindset condition to ‘think about how they would implement a strategy’.

concrete or an abstract mindset orientation leads to greater professional skepticism. In Experiment 1, the evidence under consideration constituted a fairly complete set of evidence gathered during the substantive testing phase of the audit, while, in Experiment 2, the evidence under scrutiny related to preliminary and inherently ambiguous analytical procedures (Abdolmohammadi and Wright, 1987) performed during the planning stage of the audit. Therefore, the results from Experiment 2 illustrate that the inherent ambiguity of the evidence under consideration can affect whether an abstract or concrete mindset orientation enhances professional skepticism.

Through an emphasis on task-induced mindset orientation and the resulting consequences for professional skepticism on a subsequent task (e.g., when multitasking), this research has important implications for audit practice. By demonstrating that the degree to which a preceding task is consistent with the employment of an abstract or concrete mindset can affect skepticism during the performance of a completely unrelated subsequent audit task, the present study highlights the importance of appropriate instructions and frameworks as identified by recent research (Rasso, 2015; Backof *et al.*, 2016). Our findings also alert practitioners to consider the implications for professional skepticism when auditors switch between tasks that are consistent with different mindset orientations. These insights could be used to improve scheduling of audit task so that professional skepticism is enhanced, or at least not negatively affected. As noted by Mullis and Hatfield (2018), audit firms cannot completely eliminate multitasking. However, auditors should attempt to group audit tasks so that multitasking is minimized (Mullis and Hatfield, 2018). We argue that following this advice may also mitigate negative performance because of inadequate task–mindset fit. Our findings should also be considered in light of the effects of interruptions that momentarily distract auditors’ attention (see Kim *et al.*, 2017). Nevertheless, more research is necessary to further our understanding of the types of tasks that are consistent with the employment of an abstract or concrete mindset. The current study is the first step in this direction.

If the robust results documented in the psychology literature translate into the accounting domain, an abstract mindset may be prompted by accounting tasks that require auditors to compare objects with unalignable, rather than alignable, features; to consider the *why*, rather than the *how*, aspects of a given situation; or to envision making a decision in the distant future. Accordingly, future research could explore whether audit tasks other than broad categorization of

information prompt an abstract mindset and hence affect professional skepticism along the patterns found in this study.

While our manipulation of mindsets—particularly the categorization task used to prompt an abstract mindset orientation—was based on strong theory and prior psychology experiments, the design of our experiments prevented us from verifying that our mindset manipulation was indeed successful. We also cannot completely rule out that differences in the nature of Task 1 (for both experiments), as well as potential differences in required effort, may have driven our results. However, we did not find statistically significant differences in perceived levels of effort required to complete either version of Task 1, yet acknowledge that this finding is somewhat weak because of our small sample size. A more serious concern however is, that the differences in the two Task 1 exercises (other than the mindset priming effects) may have interacted with characteristics of the different Task 2 exercises to result in differences in performance, independent of mindset orientation. It should also be noted that inferences were drawn from the results of two separate experiments. The absence of random assignment across the two experiments means that caution needs to be exercised in comparing results. Taken together the limitations provide fruitful grounds for future research in this area.

APPENDIX A: Risk Factors – Task 1 of Experiment 1 & 2

Note: the list below reflects the order of risk factors presented to participants in the concrete mindset orientation condition, where the 40 risk factors were grouped according to the three fraud risk factor categories (i.e., incentives/pressures, opportunities, and attitudes/rationalizations), consistent with AU Section 316. Twenty-eight of those statements indicate the presence of a risk while the remaining 12 statements (four within each fraud risk category) do not suggest heightened risk; in the abstract mindset orientation condition, the 40 risk factors were displayed in random order and not grouped.

INCENTIVES/PRESSURES

1. Wittim faces a high degree of competition, accompanied by declining margins
2. Wittim's products are moderately vulnerable to rapid changes in technology
3. Significant declines in customer demand and increasing business failures in Wittim's industry are not evident

4. The threat of a hostile takeover is not imminent since Wittim does not report operating losses
5. Wittim experienced recurring negative cash flows from operations while reporting earnings and earnings growth
6. Wittim is subject to new regulatory requirements
7. Wittim's management may have created high expectations for analysts and institutional investors through overly optimistic press releases
8. Wittim needs to obtain additional debt or equity financing to stay competitive and to finance major research and development
9. Wittim displays a marginal ability to meet exchange listing requirements
10. Wittim's management does not perceive adverse effects of reporting poor financial results on significant pending transactions, such as contract awards
11. Wittim's management has a moderate financial interest in the company
12. A small portion of Wittim's board of directors' compensation is contingent upon achieving aggressive targets for the company's operating results
13. Management has not signed any personal guarantees of debts of Wittim
14. Wittim's operating personnel feels moderately pressured to meet financial targets set up by the board of directors

OPPORTUNITIES

1. Wittim engages in significant related-party transactions
2. Wittim does not have the ability to dominate its industry sector. Thus, the company cannot dictate terms or conditions to suppliers or customers such that inappropriate or non-arm's-length transactions result
3. Wittim's assets and revenues are based on significant estimates that involve subjective judgments or uncertainties that are difficult to corroborate
4. Wittim does not have significant, unusual, or highly complex transactions close to the company's year-end that pose difficult "substance over form" questions
5. Wittim engages in significant operations located across international borders in jurisdictions where differing business environments and cultures exist

APPENDIX A: Risk Factors – Task 1 of Experiment 1 & 2 (continued)

6. Wittim holds several bank accounts in tax-haven jurisdictions for which there appears to be no clear business justification
7. There is no evidence that Wittim's management is dominated by a single person without compensating controls
8. There is some evidence that Wittim's audit committee oversight over the financial reporting process and internal control is ineffective
9. It is somewhat difficult to determine the individuals that have a controlling interest in Wittim
10. Wittim maintains an overly complex organizational structure involving unusual managerial lines of authority
11. Wittim has a high turnover of board members
12. Wittim's internal control components seem slightly deficient due to inadequate monitoring of automated controls
13. Wittim has high turnover rates among information technology staff
14. Overall, Wittim seems to have effective accounting and information systems in place

ATTITUDES/RATIONALIZATIONS

1. Wittim's management seems only moderately effective in communicating and enforcing the company's values and ethical standards
2. There is some evidence that Wittim's nonfinancial management is excessively preoccupied with the selection of accounting principles and the determination of significant estimates
3. Wittim has no known history of violations of securities laws or other laws and regulations
4. Wittim's management shows excessive interest in increasing the company's earnings trend
5. Wittim's management seems overly committed to analysts with respect to achieving unrealistic forecasts
6. Wittim's management has occasionally failed to correct known reportable conditions on a timely basis
7. Wittim's management seems not interested in employing inappropriate means to minimize reported earnings for tax-motivated reasons

8. There is some evidence of recurring attempts by Wittim's management to justify marginal or inappropriate accounting on the basis of materiality
9. The relationship between Wittim's management and the predecessor auditor was somewhat strained due to frequent disputes with the predecessor auditor on accounting and reporting matters
10. Wittim's management does not impose unreasonable demands on our firm (e.g., no unreasonable time constraints regarding the completion of the audit)
11. Wittim's management has placed some informal restrictions on our audit firm that inappropriately limit our ability to communicate effectively with the board of directors or audit committee
12. Wittim's management does not display domineering behavior in dealing with our firm and does not seem to attempt to influence the scope of our audit work

APPENDIX B: Case Scenario – Experiment 1

TASK 2

BACKGROUND

As part of the regular year-end audit of Premier Electro Tech - a consumer-electronics wholesaler - you are reviewing the adequacy of the allowance for uncollectible receivables. You prepare an aging schedule of accounts receivable and note a very large account is 6 months past due. The customer has returned your positive confirmation verifying the client's balance as correct. You know from your experience with Premier Electro Tech that approximately 50% of account balances 6 months past due are unrecoverable. Assume this single account balance is a material item. It is the controller's opinion that the entire amount will be recovered and there is no need to provide for the loss. You investigate the customer further and get the following description from the client's credit manager.

The customer is a rapidly expanding merchandiser of television, radio, stereo, and other consumer-electronics equipment. It began as a single-store operation in 2007 and now operates a total of 12 stores in 3 states. Further expansion is planned in the near future. Earnings growth has been strong since 2007. As the firm expanded, its average payment time on accounts receivable has steadily increased. This is due to an inadequate accounting system rather than to cash difficulties. A new computerized accounting system is presently being installed and is expected to remedy the firm's payment problems.

Based on the above information, what is your estimate of the probability that the receivable will be collected in full next year? (PLEASE CIRCLE A PROBABILITY)

0 .05 .10 .15 .20 .25 .30 .35 .40 .45 .50 .55 .60 .65 .70 .75 .80 .85 .90 .95 1.00

APPENDIX C: Case Scenario – Experiment 2

TASK 2

BACKGROUND – JRO, Inc.

JRO Inc. (JRO) is a publicly traded automotive electronics supplier headquartered in Springfield, MA. The company started operations in 2003 and has been listed on the NASDAQ since 2009. JRO designs, manufactures, and sells microelectronic components (e.g., sensors) and electronic control units (e.g., brake control systems). JRO's customer base consists of automobile manufacturers located in the Northeast Region of the United States. The company maintains a large warehouse (close to headquarters) from where products are shipped to JRO's customers. JRO has been an audit client of your firm for the last six years and all prior year integrated financial statement audits have resulted in unqualified opinions. No material weaknesses over internal controls have been detected since JRO became your firm's client.

Current Situation:

Assume that you are the audit team member in charge of planning audit procedures related to JRO's inventory. Further assume that your firm has encouraged the use of new audit analytics tools for all current year integrated financial statement audits in order to improve audit planning as well as audit effectiveness and efficiency. One of the audit analytics tools recommended by your firm is digital analysis based on Benford's Law.

As JRO's inventory consists of a wide range of products, with great differences in value and extremely different quantities of stock, you have determined that the values of the inventory should follow the natural distribution of Benford's Law. Hence, based on your request, your firm's data analytics team has analyzed inventory data files to determine whether the first digits of the electronic components inventories agree with the anticipated frequency distribution. Given that your audit team is in the early stages of determining substantive tests related to inventory, you considered a high-level first-digit test on the total inventory value associated with each item in stock as an appropriate first step for determining the *overall* reasonableness of the inventory data.

Your firm's data analytics teams provided the following report based on your request for a first-digit analysis of total inventory value associated with each item in stock at JRO's warehouse:

Summary Results

Client: JRO, Inc.

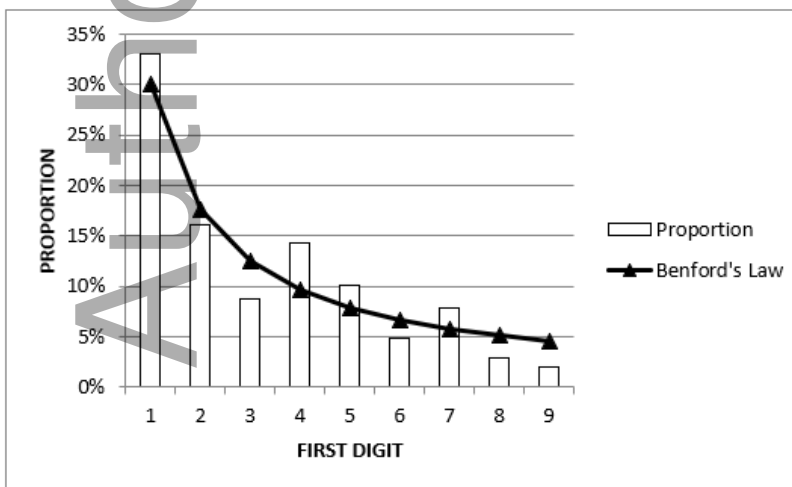
March 15, 2015

Financial Statement Date: December 31, 2014

Financial Statement Item: Inventory as of 12/31/14

Unit of Analysis: Total inventory value associated with each product in stock

Analysis Type: Benford's Analysis – First Digit



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Table 1: Results - Experiment 1

T-Test Results
DV: probability that the receivable <u>will</u> be collected in full next year

Condition	N	Mean ^a	S.D.	t	df	p-value ^b
Concrete	11	.51	.23	1.92	24	.034
Abstract	15	.68	.22			

^a A lower mean indicates greater professional skepticism

^b One-tailed significance level

Table 2: Results - Experiment 2

T-Test Results						
DV1 - likelihood that inventory is materially misstated						
Condition	N	Mean ^a	S.D.	t	df	p-value ^b
Concrete	21	3.38	1.46	1.49	33	.074
Abstract	14	4.07	1.14			
DV 2 - likelihood that inventory is materially misstated due to fraud						
Condition	N	Mean ^a	S.D.	t	df	p-value ^b
Concrete	21	3.10	1.26	.84	33	.203
Abstract	14	3.43	.94			
DV 3 - likelihood that inventory is materially misstated due to error						
Condition	N	Mean ^a	S.D.	t	df	p-value ^b
Concrete	21	3.71	1.27	1.69	32.43	.050

Abstract	14	4.29	.73			
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^a A higher means indicate greater professional skepticism

^b One-tailed significance level, rounded.

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