Professional Skepticism Traits and Fraud Brainstorming Quality

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ABSTRACT

Auditing standards emphasize that fraud detection is an important objective of an audit and require the exercise of professional skepticism (PS) and a discussion among the engagement team to prevent and detect fraud. The purpose of this study is to examine whether professional skepticism is a driver of fraud brainstorming quality. We investigate the relationship between fraud brainstorming quality, using the measure of Brazel et al. (2010), and auditor's professional skepticism traits. Using proprietary data from Dutch audit firms on 125 engagements, we find that neutral trait skepticism and professional moral courage of the partner have a significant effect on fraud brainstorming quality. We observe a higher attendance rate and contribution of specialists, more extensive discussion, longer preparation, and longer sessions for engagements led by partners with high neutral trait skepticism and high moral courage. We find no significant results for partners with a high presumptive doubt trait. Additional cross-sectional analyses show that the effect of professional skepticism on FBQ depends on situational, organizational conditions.

INTRODUCTION

This paper examines the role of professional skepticism as a driver of fraud brainstorming quality. Fraud has important economic and social consequences, harming financial statement users' trust and social integrity (AFM 2018). Auditing standards therefore require auditors to explicitly consider the risks of material misstatements due to fraud (e.g., SAS No. 99; ISA 240). Specifically, auditing standards require a discussion among the engagement team regarding the risks of material misstatements due to fraud (i.e., fraud brainstorming).[1] Auditing standards also emphasize the need for auditors to exercise professional skepticism throughout the audit and particularly when considering the risk of material misstatements due to fraud (e.g., AS 2110; ISA 240; SAS. No. 99).[2]

Prior literature has focused on fraud brainstorming practices after the initial implementation of SAS No. 99 (Bellovary and Johnstone 2007; Brazel et al. 2010; Dennis and Johnstone 2016). To the best of our knowledge, prior research has not paid any attention to the drivers of fraud brainstorming quality. Understanding the drivers of fraud brainstorming quality is, however, important because it is an important element of the audit process, as it enables the identification of fraud risk factors and associated audit responses (Carpenter 2007, Hoffman and Zimbelman 2009; Lynch et al. 2009; Trotman et al. 2009; Chen et al. 2015). In this study, we focus on professional skepticism as a potential driver of fraud brainstorming quality. Professional skepticism is considered a key input factor to the audit process to support a quality audit (IAASB 2015). The importance of professional skepticism is widely and indisputably recognized both by regulators (e.g., PCAOB 2015b; IFIAR 2015), standard setters (e.g., IAASB 2017), practitioners (e.g., ICAEW 2018), and academics (e.g., Brazel and Schaefer, 2015; Nolder and Kadous, 2018). However, there is little research that has investigated which audit processes are affected by professional skepticism and how professional skepticism affects these processes. Prior literature has studied the effect of auditor's professional skepticism on fraud detection in experimental settings (for an overview see Brazel and Schaefer, 2015), but there is no research that investigated the effect of professional skepticism on fraud brainstorming quality. Therefore, the purpose of this study is to examine the relationship between professional skepticism, more specifically the partner's professional skepticism traits, and fraud brainstorming quality.

Our study provides several incremental contributions to prior fraud brainstorming and professional skepticism research, and to the broader psychological literature on group decision

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[1] While SAS No. 99 refers to brainstorming specifically, ISA 315 simply refers to "a discussion" and does not stipulate the type of group discussion (Trotman et al. 2009). The intention and general wording of both standards are, however, similar.

[2] A lack of professional skepticism is also regularly cited in inspection reports as a problem for auditors' fraud assessments (e.g., PCAOB 2008).

making. First, our study is the first to investigate the effect of professional skepticism on fraud brainstorming quality. As a higher fraud brainstorming quality leads to better fraud risk identification and more effective audit plans to identify misstatements due to fraud, fraud brainstorming quality indirectly affects audit quality. With the results of our study we provide insights regarding fraud brainstorming practices under ISA 240 and compare this with insights from the US setting. Further, to investigate the effect of professional skepticism, we include both individual and social characteristics which together form an auditor's professional skepticism to enable us to make the distinction between the effect of professional skepticism traits and the effect of other characteristics of professional skepticism. Next, our study is the first to examine differences in fraud brainstorming quality and the underlying items across professional skepticism traits partitions. Investigating the underlying items across these partitions allow us to make recommendations for improving fraud brainstorming in practice. Thus, the result of our study are not only relevant for the academic literature, but also for audit practice, standard setters and regulators. Given that professional skepticism traits are inherent and relatively stable over time, the results of this study might, for example help audit firms in selecting and training their people. Last, brainstorming has been studied within auditing (see, e.g., Trotman, Bauer, and Humphreys 2015), and within the broader psychological literature on group decision making (see, e.g., Brown and Paulus 2002; Kerr and Tindale 2004). The focus of this body of research has, however, been heavily on whether groups outperform individuals, and on the impact of group size and the method of brainstorming (e.g., electronic, nominal). Furthermore, participants in these psychological studies are most often unexperienced novices such as students, while participants in fraud brainstorming are experienced professionals. With the results of our study, based on data of 125 audit partners, we contribute to the broader psychological literature on group decision making by investigating drivers of brainstorming.

While prior research has provided some evidence on auditor professional skepticism and fraud identification and detection in experimental settings, there is no empirical evidence on how the professional skepticism traits of an auditor might affect fraud brainstorming sessions in practice as an important scientific challenge is the lack of availability of actual data from the field. For this study, we were able to go inside the "black box" of individuals, audit teams and the audit process. We sent out a survey to auditors in different engagement teams, and in different firms. This provides us with unique data to examine the fraud brainstorming quality and the effect of professional skepticism traits on fraud brainstorming quality.

Analyzing a sample of 125 engagements from five Dutch audit firms (two Big 4 and three non-Big 4) relating to the year 2016, the result show that neutral trait skepticism and professional moral courage of the partner have a significant effect on fraud brainstorming quality. More specifically, we observe higher attendance rate and contribution of specialists,

more extensive discussion, longer preparation, and longer sessions for partners with high neutral trait skepticism and high moral courage. We find no significant results for partners with a high presumptive doubt trait. Next, we find cross-sectional evidence showing that the effect of professional skepticism traits on fraud brainstorming quality depends on organizational conditions. We find that professional moral courage of the partner has an effect on fraud brainstorming quality in firms with a positive performance evaluation system towards professional skepticism and in firms with a high professional orientation. Last, we find that fraud brainstorming quality is somewhat different in our sample compared to fraud brainstorming quality observed in the US (see Brazel et al. 2010; Dennis and Johnstone 2016), especially regarding fraud brainstorming attendance and communication as the attendance rate and contribution of specialists is lower in our sample. We do not find important differences for professional skepticism traits with regard to fraud brainstorming structure and timing, and engagement team effort.

LITERATURE REVIEW AND HYPOTHESIS

Auditors are responsible for providing reasonable assurance that the financial statements of the client are free from material misstatements due to error or fraud (IFAC 2009b). Auditing standards therefore require a discussion among the engagement team members, at the beginning of the audit, to discuss the susceptibility of the client's financial statements to material misstatements due to fraud or error (IFAC, 2009b). Although the intention and the wording are the same, the ISA's do not specifically refer to this discussion as "brainstorming", contrary to SAS No. 99. The concept of brainstorming is commonly used in audit literature and audit practice where the brainstorming session includes identifying fraud risk, fraud risk assessment and planning the fraud risk responses (Hammersley 2011).

Fraud Brainstorming Quality

Prior research has investigated fraud brainstorming processes and outcomes and demonstrates that fraud brainstorming enables the identification of fraud risk factors and associated audit responses (Carpenter 2007; Hoffman and Zimbelman 2009; Lynch et al. 2009; Trotman et al. 2009; Chen et al. 2015). Brazel et al. (2010) developed a measure of fraud brainstorming quality, where quality is a function of attendance and communication, brainstorming structure and timing, and engagement team effort. They report descriptive statistics on the 21 items underlying fraud brainstorming quality. Dennis and Johnstone (2016) update and extend their insights with regard to fraud brainstorming quality and practices by not only reporting descriptive statistics on the underlying items of fraud brainstorming quality, but

also on differences in audit team characteristics and brainstorming practices across risk and trading-status partitions.

In addition to the development of a fraud brainstorming quality measure, Brazel et al. (2010) also developed and tested a conceptual model that links fraud risk factors, fraud risk assessment, and fraud risk responses to fraud brainstorming quality. They found that fraud brainstorming quality moderates the relations between fraud risk factors and fraud risk assessments, and between fraud risk assessments and fraud-related testing. These results suggest that higher fraud brainstorming quality leads to better fraud risk identification and more effective audit plans to identify misstatements due to fraud. Yet, to deal with fraud that causes a material misstatement in the financial statements, ISA 240 not only requires a discussion among the engagement team member, but also the exercise of professional skepticism throughout the audit.

Professional Skepticism

Both regulators and standard setters (e.g., AFM 2014; IFIAR 2015; IAASB 2015, 2017; PCAOB 2015b) and academic literature (e.g., Glover and Prawitt 2014; Hurtt et al. 2013; Nelson 2009; Nolder and Kadous 2018) recognize the fundamental role of professional skepticism as an input to audit quality. When auditors apply more professional skepticism in their judgments and actions, the level of audit quality attained on audit engagements should increase. To better understand the link between an auditor's professional skepticism and audit quality, research has attempted to define and model professional skepticism.

The extant literature emphasizes three different definitions of professional skepticism. First, the neutral definition which states that the auditor neither assumes that management is dishonest nor assumes unquestioned honesty (O'Malley 2000) and which is referenced in numerous auditing standards. Second, the professional moral courage definition of professional skepticism, where auditors vary in their willingness to take skeptical actions (Hurtt et al. 2013). Last, the presumptive doubt definition which states that auditors present different levels of dispositional trust (McKnight et al. 2002; McKnight et al. 2004; Harding et al. 2016) and have relatively more doubt about the validity of an assertion than about its invalidity, assuming some level of management bias or dishonesty by management unless evidence indicates otherwise (Bell, Peecher, and Solomon 2005). This definition is consistent with fraud standards and under this view, skepticism is the opposite of trust (Shaub 1996).

Different studies in prior literature have developed a model for professional skepticism (Nelson 2009; Hurtt et al. 2013; Glover and Prawitt 2014; Nolder and Kadous 2018). The general idea of those models is that professional skepticism arises as a consequence of the combination of individual characteristics including personality traits, knowledge, motivation, and social characteristics like firm culture, client pressure, and firm methodology.

Contrary to what one would expect, given the importance placed on the exercise of professional skepticism in fraud detection, little research to date has focused on this topic. Carpenter and Reimers (2013) investigated the importance of a partner's emphasis on skepticism (i.e., tone at the top) with respect to fraud risk identification, fraud risk assessment, and fraud risk responses. Based on an experiment with 80 managers from Big 4 firms, they found that audit partners who put more emphasis on skepticism cause audit managers to more effectively and efficiently identify fraud risk factors and choose relevant audit testing procedures. McAllister, Blay, and Kadous (2018) conducted an experiment with 267 accounting master students and found that including participants with a high professional skepticism in a group increases the group's perceived risk of fraud. These results suggest that there is a link between professional skepticism and fraud detection, but there is no evidence for the relationship between fraud brainstorming quality and professional skepticism, and more specifically professional skepticism traits. Fraud brainstorming is a planning stage activity which includes identifying fraud risk factors, fraud risk assessment and planning the associated fraud risk responses (Carpenter 2007, Hoffman and Zimbelman 2009; Lynch et al. 2009; Trotman et al. 2009;Hammersley 2011; Chen et al. 2015). In accordance with ISA 240, the fraud brainstorming session includes a discussion of the susceptibility of the financial statements to material misstatement due to fraud which provides the audit partner to share insights about fraud and enables the partner to consider appropriate fraud risk responses.[3] A more skeptical engagement leader might discuss more extensively, which leads to a higher fraud brainstorming quality. However, as discussed above, in prior literature, professional skepticism is modelled as a combination of both individual and social characteristics (e.g., Nolder and Kadous 2018). Consequently, it is not evident that the individual professional skepticism traits have an impact on the audit process or outcome. Therefore, we control for both individual and social characteristics which together form an auditor's professional skepticism to enable us to make the distinction between the effect of professional skepticism traits and the effect of other characteristics of professional skepticism. We focus on professional skepticism traits as used in prior literature (e.g., Hurtt et al. 2013; Quadackers et al. 2014; Cohen et al. 2017) and formulate the following research question:

RQ1: To what extent do professional skepticism traits of the engagement partner affect fraud   brainstorming quality?

Figure 1 illustrates our conceptual model. We expect a positive effect of professional skepticism traits on fraud brainstorming quality, while controlling for other individual

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[3] In the Netherlands, the ISA's are adopted without modifications. Therefore, auditors are required to have a discussion among the engagement team regarding the risks of material misstatements due to fraud (i.e., a fraud brainstorming session) in accordance with ISA 240.

characteristics (knowledge and experience), and social characteristics (tone at the top and time budget pressure).

[Insert Figure 1 here]

METHODOLOGY

Participants

To investigate the effect of professional skepticism traits on fraud brainstorming quality, we combine survey and proprietary archival data which we obtained from five Dutch audit firms participating in our project: two Big 4 and three non-Big 4 audit firms.[4] Each audit firm provided a selection of engagements (number depending on the size of the audit firm) and archival data related to those engagements. We selected a number of auditors to participate in our survey from the engagement teams of each of these engagements, based upon their personnel number, team role, and hours worked on the engagement.[5]

Table 1 details the construction of our sample. We received information from the Dutch audit firms for in total 342 engagements. For these engagements, we were able to select 312 partners to participate in our study.[6] Invitations to participate in the study were sent via e-mail at the beginning of the year 2018 and up to four reminders were sent.[7] We received 214 completed surveys, which represent a 68.6 percent response rate. This is a rather high response rate compared to response rates in other auditing surveys (e.g., 16 percent response rate by Nelson et al. (2002); 48.8 percent response rate by Brazel et al. (2010); see Nkansa and Bailey 2018). Due to missing data, we report statistics of fraud brainstorming quality based on 185 observations. Further, to investigate RQ1, we use a sample of 125 observations as a result of a loss of 60 observations due to missing data for auditor and client characteristics.[8]

[Insert Table 1 here]

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[4] This study is part of a Foundation for Auditing Research (FAR) project: "Professional Skepticism Profiles, Effects on Audit Processes and Outcomes, and the Moderating Role of Audit Firm Culture". The FAR facilitated the delivery of data from the audit firms in the Netherlands to the research team.

[5] For each engagement, we tried to select at least a partner, a manager, and a senior/staff.

[6] We have multiple engagements with the same engagement partner in our sample, for which we were able to send only one survey per respondent. This resulted is the selection of 312 partners for 342 engagements.

[7] Emails were sent via CenterData, an independent datacenter. All the data were delivered to CenterData, where the data were anonymized and transformed before they were delivered to our research team.

[8] There are no systematic differences between the 125 observations in the final sample and the 60 lost observations; the differences in means for *HPS*, *PMC* and *RIT* are insignificant (respectively $p = 0.312$, $p = 0.990$, and $p = 0.912$).

Instrument

We constructed a survey which contained questions on the demographics of the auditor (e.g., experience, personality traits), the accounting firm (e.g., tone at the top, time budget pressure), a specific client (e.g., client importance, client experience), and the fraud brainstorming session of that specific client engagement (e.g., fraud brainstorming attendance, fraud brainstorming preparation). The auditors selected for participation in the survey received an invitation via mail indicating to which client the engagement-specific questions relate.

To measure the professional skepticism traits, we included the Hurtt Professional Skepticism Scale (Hurtt 2010), Rotter's Interpersonal Trust Scale (Wrightsman 1991) and Professional Moral Courage Scale (Sekerka et al. 2009). The score of an auditor on the Hurtt Professional Skepticism Scale is used to measure the neutral trait skepticism, with higher scores indicating higher neutral trait skepticism. The scale consists of 30 items scored on a 6-point Likert Scale, ranging from strongly disagree to strongly agree. The Hurtt Professional Skepticism Scale includes questions designed to assess whether an auditor has a questioning mind, is willing to suspend judgment, searches for knowledge, has interpersonal understanding, and has autonomy and self-esteem.[9] The Professional Moral Courage Scale consists of 15 items that are scored on a 5-point Likert Scale, varying from almost never true to almost always true. Adding up the scores provides the professional moral courage score with higher scores indicating higher willingness to take skeptical actions. Moral courage explains why one actor acts in an ethical manner whereas another who faces the same ethical judgment in the same situation does not act in an ethical manner (Kidder 2005; Sekerka and Bagozzi 2007; Khelil, Hussainey, and Noubbigh 2016). The scale is intended to assess five dimensions: moral agency, multiple values, endurance of threats, going beyond compliance, and moral goals.[10] The score of the auditor on Rotter's Interpersonal Trust Scale provides the interpersonal trust score with higher scores indicating higher interpersonal trust. The scale consists of 25 items that are scored on a 5-point Likert Scale, varying from strongly disagree to strongly agree. The Rotter Interpersonal Trust Scale (RIT) is intended to capture 'a generalized expectancy held by an individual or a group that the word, promise, verbal or written statement of another individual or group can be relied upon' (Rotter 1967, p. 651). We use the reversed of the score on the RIT to measure the presumptive doubt trait skepticism.[11]

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[9]   Example of questions: 'I often accept other peoples' explanations without further thought.'; 'I often reject statements unless I have proof that they are true.'

[10] Example of questions: 'I am the type of person who uses a guiding set of principles from the organization when I make ethical decisions on the job.'; 'I act morally even if it puts me in an uncomfortable position with my superiors.'

[11] Example of questions: 'In dealing with strangers one is better off to be cautious until they have provided evidence that they are trustworthy.'; 'Most experts can be relied upon to tell the truth about the limits of their knowledge.'

Descriptive statistics regarding the measures of professional skepticism traits are shown in Table 2. The mean score for *HPS*, *PMC* and *RIT* is respectively 141.33, 84.85, and 75.13. These results are similar to the results of Quadackers et al. (2014), who also use absolute scores of the scales, and Cohen et al. (2017), who use the average scores of the scales (the absolute score divided by the number of questions). Further, the Cronbach's alpha values for the scales are acceptable, 0.83 for the Hurtt Professional Skepticism Scale, 0.91 for the Professional Moral Courage Scale and 0.79 for Rotter's Interpersonal Trust Scale, which is also similar to the results of Quadackers et al. (2014).

[Insert Table 2 here]

Research Design

To examine RQ1, we estimate the following OLS regression model[12]:

$$FBQ = \beta_1 + \beta_2 HPS + \beta_3 PMC + \beta_4 RIT + \beta_5 FRAUDEXP + \beta_6 MATMISEXP\_cat + \beta_7 AUDITEXP\_cat + \beta_8 CLIENTEXP + \beta_9 TEAMEXP + \beta_{10} TONE\_AT\_TOP + \beta_{11} BUDGETPRESSURE + \beta_{12} TEAMSIZE + \beta_{13} FRAUDDETECT + \beta_{14} MATMISDETECT + \beta_{15} CLIENTIMPORTANCE + \beta_{16} MANAGERCHANGE + \beta_{17} SENIORCHANGE + \beta_{18} OPENDISC + \beta_{19} ROUNDROBIN + \beta_{20} NOMINAL + \beta_{21} INDUSTRY_{it} + \beta_{22} FIRM_{it} + \varepsilon_{it}$$

Where *FBQ* is the fraud brainstorming quality measured using the Brazel et al. (2010) 21-item validated scale (see Appendix A for variable definitions). *HPS*, *PMC* and *RIT* are our variables of interest measuring trait skepticism. These are respectively the score of an auditor on the Hurtt Professional Skepticism Scale, Professional Moral Courage Scale, and the reversed Rotter Interpersonal Trust Scale. Further, we include other individual and situational characteristics which, together with the professional skepticism traits, form an auditor's professional skepticism. We capture the auditor's knowledge and experience by including the variables *FRAUDEXP*, *MATMISEXP_cat*, *AUDITEXP_cat*, and *CLIENTEXP*. The variables *FRAUDEXP* and *MATMISEXP_cat* measure the number of prior engagements the participant served on in which fraudulent financial reporting/material misappropriation of assets was identified. The number of years of audit experience is measure by *AUDITEXP_cat*. *CLIENTEXP* measures the client tenure as a partner, more specifically the number of years served as an engagement leader for this client. To take into account situational factors, we include *TEAMEXP*, *TONE_AT_TOP*, and *BUDGETPRESSURE*. *TEAMEXP* measures the

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[12] As the dependent variable in our model, *FBQ*, is not a continuous variable, we perform a robustness check by estimating the relationship following a Poisson model. The result are very similar.

perception of the engagement leader of the entire engagement team's level of expertise on this client on a scale from 1 to 7 (Dennis and Johnstone 2016). We use the reversed score of the measure of Sweeney et al. (2010) of perceived unethical tone at the top to measure *TONE_AT_TOP*. A proper tone at the top is important to the success of the brainstorming session (Beasley and Jenkins 2003; Landis, Jerris, and Braswell 2008). *BUDGETPRESSURE* measures the perceived time budget pressure on a scale from 1 to 7. Consistent with prior literature, we include control variables which have been shown to be related to fraud detection and fraud brainstorming. Specifically, *TEAMSIZE*, which is the audit team size, is included to capture client complexity and client size as these are primary factors for labor on an audit engagement (Causholli, De Maritinis, Hay, and Knechel 2010); *FRAUDDETECT* and *MATMISDETECT*, which are dichotomous variables equal to 1 if fraudulent financial reporting/material misappropriation of assets has been detected at the client during the past three years; *CLIENTIMPORTANCE*, which measures the importance of a client on a scale from 1 to 7; and *MANAGERCHANGE* and *SENIORCHANGE* measure whether the lead engagement manager/senior has changed from the prior year. If the lead manager/senior did not change, he/she has more client-specific experience (Dennis and Johnstone 2016). Next, the variables capturing the nature of the format of the discussion *OPENDISC*, *ROUNDROBIN*, and *NOMINAL*, which measure respectively whether the discussion was open (i.e., brainstorming in an unstructured manner), round robin (i.e., brainstorming in a relatively structured manner by taking turns presenting ideas), or nominal (i.e., developing a list of ideas based on auditors' individual lists with no discussion with other engagement team members), are included. Previous research has shown that brainstorming effectiveness depends on the nature of the format of the discussion (Beasley and Jenkins 2003; Carpenter 2007; Chen et al. 2015; Landis et al. 2008). Finally, we include industry and audit firm fixed effects, and all regressions are based on robust standard errors.

RESULTS

Descriptive Statistics Fraud Brainstorming Quality and Underlying Items

First, we investigate both the total fraud brainstorming quality and the underlying items compared to fraud brainstorming quality as reported by Brazel et al. (2010) and Dennis and Johnstone (2016) and across our partitions of professional skepticism traits to see whether fraud brainstorming quality is different between high versus low trait skepticism. We classify observations with above (below) median *HPS*, *PMC* and *RIT* as "high" ("low") trait skepticism and perform two-samples *t*-tests.[13] Table 3 presents the relevant descriptive statistics.

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[13] Dichotomizing variables relating to individual differences is rather common in accounting research (e.g., Gissel and Johnstone 2017; Quadackers et al. 2014). Previous research does not document a scale score that is

The mean *FBQ* in the overall sample is 11.6, with a range from 5 to 20. Compared to Brazel et al. (2010) and Dennis and Johnstone (2016), our mean is a little higher (means of 10.56 and 10.83, respectively). The minimum and maximum *FBQ* scores in our sample are also higher compared to Brazel et al. (2010) and Dennis and Johnstone (2016) (ranges of 3–18 and 2–18, respectively). With respect to the difference between high and low trait skepticism, we find that partners with a high neutral trait (*HPS*) and high moral courage (*PMC*) report significant higher fraud brainstorming quality. Meanwhile, partners with a high presumptive doubt trait skepticism (*RIT*) report significant lower fraud brainstorming quality. The 21 underlying items of *FBQ* are based on three elements: attendance and communication, brainstorming structure and timing, and engagement team effort.

Attendance and Communication

With regard to attendance and communication, the results show that for 81 percent of the engagements, the partner or a forensic specialist led the session. All levels of the engagement team attended the session in 96 percent of the cases, while the attendance of a forensic, IT and tax specialist is much lower, in respectively 5, 39, and 21 percent of the sessions. Compared to the attendance reported by Brazel et al. (2010) and Dennis and Johnstone (2016), the attendance of the partner and other levels of the engagement team is higher in our sample, but the attendance of forensic, IT and tax specialists is much lower in our sample. Further, we find that partners indicate an average contribution of staff (4.5) and a slightly above average to high contribution of other team members (5.32 – 5.89) to the brainstorming session. On the other hand, they indicate

a slightly below average contribution of forensic specialists (3.02). The results reported in Brazel et al. (2010) show a lower contribution of staff (3) and seniors (4.2) and a higher contribution of forensic specialists (4.9) compared to our sample. Last, the team members indicate a high level of openness to ideas from the partners in our sample. These results are similar to the results of Brazel et al. (2010) and Dennis and Johnstone (2016).

[Insert Table 3 here]

Regarding the difference between high and low trait skepticism, the results show that there is a significant difference between the attendance and contribution to the session of a partner

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indicative of high levels of trait PS, although it is common practice to use the median as cut point. However, we acknowledge that this is somewhat arbitrary. The convention from psychology is to consider everything that is within 0.5 SD of the mean as "average" (and lower scores as "low" and higher scores as "high"), however this is also criticized (Johnson 2019). Our results are very similar when using 0.5 SD above the mean as cut point.

with high neutral trait and high moral courage compared to the attendance and contribution to the session of a partner with low neutral trait and low moral courage. More specifically, there is a significantly higher attendance rate of specialists and a higher contribution of all team members, especially forensic specialists. Again, we find opposite results for partners with a high presumptive doubt trait with lower attendance rates and lower contribution.

Brainstorming Structure and Timing

For the brainstorming structure and timing, we observe, in the overall sample, that an agenda was used 88 percent of the time and a checklist was used 37 percent of the time. The use of an agenda in our sample is similar to Brazel et al. (2010) and Dennis and Johnstone (2016), whereas the use of checklists in our sample is higher compared to their samples. Next, with respect to timing, we find that fraud brainstorming sessions were held at the end of the prior year audit for 15 percent of the engagements and during pre-planning or early in planning for 68 percent of the engagements. Brazel et al. (2010) report that 16 percent (65 percent) of the engagements in their sample held a session at the end of the prior year audit (during pre-planning or early in planning) which is similar to our sample. We do not observe many significant differences with respect to brainstorming structure and timing when comparing high and low trait skepticism. We only find that engagement leaders with high trait skepticism more frequently plan a session at the end of prior year audit.

Engagement Team Effort

With regard to engagement team effort, the results show that on average 6 hours are spent by the engagement team preparing for the session and the average length of a session is 66 minutes. The preparation and duration of the sessions in our sample is lower (higher) compared the preparation and duration reported by Brazel et al. (2010) (Dennis and Johnstone 2016). Further, 46 (57) percent of the engagement teams held multiple sessions (developed a list of fraud risks prior to brainstorming) which is similar to Brazel et al. (2010). Last, the engagement leaders in our sample report a moderate to high amount of discussion about how management might perpetrate fraud and about audit responses to fraud risk, which is similar to Brazel et al. (2010). With respect to the difference between high and low trait skepticism, the results show that especially engagement leaders with high moral courage report a higher engagement team effort with a significantly longer preparation of the session, longer session, higher amount of discussion and significantly more use of a list of identified fraud prior to the session.

In sum, we observe that fraud brainstorming quality is somewhat different in our sample compared to fraud brainstorming quality observed in the US, especially regarding fraud brainstorming attendance and communication. More specifically, the attendance rate and

contribution of specialists is lower in our sample. With regard to structure and timing, and engagement team effort, we do not observe big differences.

Regarding the difference between high and low trait skepticism, we specifically find that there is a significantly higher attendance rate and contribution of specialists, and a higher extent of discussion about how management might perpetrate fraud for sessions of partners with high neutral trait skepticism and high moral courage. Further, partners with high moral courage make less use of checklists, take more time preparing the session, have longer fraud brainstorming sessions, more often ask team members to identify risk prior to the session, and have a more extensive discussion about audit responses to fraud risk. We find opposite results for partners with a high presumptive doubt trait with lower attendance rates and lower contribution and no list of identified risks prior to the session.

Descriptive Statistics Control Variables

To examine RQ1, we combine the survey data with archival data. Table 4 provides the descriptive statistics regarding the variables in our regression model. With regard to experience, the results show that the engagement leaders in our sample on average have served on six engagements in which fraudulent financial reporting was identified. Further, they on average served on one to two engagements in which material misappropriation of assets was identified. The mean audit experience in general is 3.85 (coded 1–4), indicating that partners have 11–15 years of audit experience in general. The engagement partner served on average one to three years for this client, resulting in a mean *CLIENTEXP* of 2.26 (coded 1–3). The auditors in our sample are slightly more experienced than the auditors in the sample of Brazel et al. (2010) and Dennis and Johnstone (2016), however the reported client experience is similar. The engagement leaders perceive the level of expertise of the entire engagement team on this specific client as moderate to high, which is similar to Brazel et al. (2010) and Dennis and Johnstone (2016). The perceived ethical tone at the top is relatively high (5.7 on a scale of 1=low to 7=high) and time budget pressure is relatively low (3.2 on a scale of 1=low to 7=high). The clients in the sample are not very complex with a mean score of 1.58 (coded 1–5), which indicates an average team size of six to ten auditors. The number of engagements in our sample where fraudulent financial reporting (material misappropriation of assets) has been detected at the client during the past three years is small. Only in five (eight) percent of the engagements was fraud detected recently, which is similar to Dennis and Johnstone (2016) but lower than the analogous means of 24 percent in Brazel et al. (2010). 27 percent of the engagements had a change of lead engagement manager/senior compared to the prior year. Dennis and Johnstone (2016) reported a similar manager turnover (34 percent) but a greater transition at the senior auditor level (54 percent). Regarding the format of discussion, we find that open discussion is still the predominant format (86 percent of the

engagements), which is similar to Brazel et al. (2010) and Dennis and Johnstone (2016). Round robin (25 percent of the engagements) and nominal group (3 percent of the engagements) are less frequently used.[14] Last, untabulated results show that the largest industy respresentations are financial services (28 percent) which is similar to Dennis and Johnstone (2016) but different from Brazel et al. (2010) with respectively 29 and 7 percent.

[Insert Table 4 here]

Correlation Matrix

Table 5 reports the correlation matrix with significance levels reported at the 0.05 level. The correlation between *HPS* and *RIT*, *HPS* and *PMC*, and *PMC* and *RIT* is respectively 0.008 (p = .928), 0.461 (p = 0.000), and -0.154 (p = 0.086). These results indicate that the three professional skepticism traits represent separate constructs.[15] Further, *HPS* and *PMC* are moderately positively correlated with *FBQ*. The correlations between the other variables are small and the Variance Inflation Factors (VIF) do not exceed 3.53 which suggests that multicollinearity is not a concern.

[Insert Table 5 here]

Regression Results

To investigate RQ1, we estimate the regression model. Table 6 presents the results for RQ1. We observe that both neutral trait skepticism and moral courage are predictive of fraud brainstorming quality as *HPS* and *PMC* are significantly positively associated with *FBQ*. Further, the results show that the variables *TEAMEXP*, *TEAMSIZE*, *CLIENTIMPORTANCE*, and *NOMINAL* are significantly positively associated with *FBQ* indicating that also the experience of the engagement team, the size, complexity and importance of the client, and the format of the discussion have an effect on fraud brainstorming quality. We also run the regression including all measures of professional skepticism traits in the same model and observe that the PMC scale dominates the HPS scale in predicting fraud brainstorming quality.

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[14] More than one format could be used during the same engagement, so these numbers do not necessarily need to add to 100%.

[15] This is also confirmed by a factor analysis.

These results indicate that especially high professional moral courage of the partner has a positive effect on fraud brainstorming quality.

[Insert Table 6 here]

ADDITIONAL ANALYSES

First, we investigate *how* professional skepticism affects fraud brainstorming quality. To this end, we rerun the regressions with the three elements of fraud brainstorming quality as dependent variables and professional skepticism traits as variables of interest, while controlling for individual characteristics and social factors. Table 7 presents the results of these analyses. These results indicate that a high neutral trait skepticism, and, especially, a high moral courage of the partner has a positive significant impact on the attendance and communication in fraud brainstorming. We do not find a significant effect of professional skepticism traits on fraud brainstorming structure and timing, or on engagement team effort. These results are in line with the results of the two samples *t*-tests.

[Insert Table 7 here]

Next, we investigate *when* professional skepticism affects fraud brainstorming quality. The effect of professional skepticism could be dependent on different situational, organizational conditions. First, the effect of professional skepticism on FBQ could depend on the performance evaluation systems in place. Brazel et al. (2016) found that the outcome of the audit process biases the supervisor's evaluations of skeptical behavior. Their results showed that the auditors who employ an appropriate level of skepticism but do not identify a misstatement are penalized by the supervisors. Thus, professional skepticism might have a larger impact when a positive performance evaluation system is in place and professional skepticism is rewarded. To test this, we use the performance evaluation system measure of Cohen et al. (2017) and split the sample based on the mean of this variable. We find that when the audit firm is perceived as rewarding professional skepticism, high moral courage of the partner has a positive effect on fraud brainstorming quality. We do not find an effect of professional skepticism traits on FBQ when the firms do not reward professional skepticism. Next, the focus of the firm on professionalism versus commercialism might reinforce the effect of professional skepticism on FBQ. Using the measure of professional orientation of Wittek, van der Zee, and Mühlau (2008), we rerun the regression on a subsample split at the mean of

the professional orientation variable. Untabulated results show that the professional moral courage of the partner has an effect in firms with a high professional orientation.

CONCLUSIONS, LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH

Examining professional skepticism as a driver of fraud brainstorming quality, we find that the neutral trait skepticism and professional moral courage of the partner have a significant positive effect on fraud brainstorming quality. We do not find a significant effect for the presumptive doubt trait skepticism. More specifically, the descriptive statistics show higher attendance rate and contribution of specialists, more extensive discussion, longer preparation, and longer sessions for partners with high neutral trait skepticism and high moral courage. We find opposite results for partners with a high presumptive doubt trait. These results would suggest that the inverse of trust appears less appropriate to measure professional skepticism, while argued otherwise in prior literature (e.g., Quadackers et al. 2014). This conclusion is supported by recent findings in the literature showing that trust between auditors and clients will enhance professional skepticism (Aschauer, Fink, Moro, van Bakel-Auer, and Warming-Rasmussen 2017) and that trust is an important aspect in the audit process which can contribute to the independence of the auditor (Knechel et al. 2020). Further, additional analyses show that the effect of professional skepticism on FBQ depends on situational, organizational conditions. We only observe an effect of professional moral courage on fraud brainstorming quality in audit firms with a positive performance evaluation system and in firms with a high professional orientation. Last, we observe differences in fraud brainstorming quality between our Dutch sample compared to fraud brainstorming quality observed in the US, especially regarding fraud brainstorming attendance and communication. More specifically, the attendance rate and contribution of specialists is lower in our sample. With regard to structure and timing, and engagement team effort, we do not observe big differences.

This study contributes to the literature by being the first to provide evidence for the relationship between an auditor's professional skepticism traits and fraud brainstorming quality. First, we address several calls in research to examine auditor characteristics (e.g., Defond and Zhang, 2014). DeFond and Zhang (2014, p. 304) 'encourage future research to consider additional individual auditor characteristics, such as professional skepticism, personality traits, gender, the complex audit team interactions, and the socio-economic characteristics.' Next, as a higher fraud brainstorming quality leads to better fraud risk identification and more effective audit plans to identify misstatements due to fraud, fraud brainstorming quality indirectly affects audit quality. Evidence for the relation between professional skepticism traits and fraud brainstorming quality therefore also is evidence for professional skepticism traits as an input for audit quality. The results of our study are not only

relevant for academics, but also for audit practice, standard setters and regulators. Based on the insights from our study regarding fraud brainstorming quality and the underlying items across professional skepticism traits partitions, recommendations for fraud brainstorming practices might improve fraud brainstorming quality in practice. Further, the results of this study might help audit firms in selecting and training their people.

We note that these results should be interpreted with some possible limitations in mind. First, we cannot completely rule out the possibility that our results are driven by omitted variable bias. Second, the participants of our survey are all auditors in the Netherlands. It is possible that professional skepticism traits and organizational conditions differ across countries.

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Figure 1 Conceptual model

Professional Skepticism

| Personal Characteristics |
| *EXPERIENCE* |
| *KNOWLEDGE* |

| PS Traits |
| *HPS* |
| *PMC* |
| *RIT* |

| Situational Characteristics |
| *TONE AT THE TOP* |
| *BUDGET PRESSURE* |

→ Fraud Brainstorming Quality
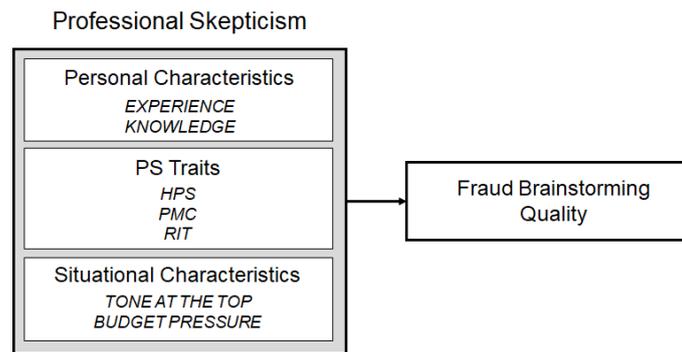
Table 1 Sample Composition

Panel A. Sample based on survey data

	Total	Firm 1	Firm 2	Firm 3	Firm 4	Firm 5	Firm 6
Selected engagements	**342**	78	13	140	36	49	26
Selected partners for survey	**312**	74	12	128	34	42	22
Respondents	**214**	59	7	79	21	30	18
Response rate	**68.6%**	79.7%	58.3%	61.7%	61.8%	71.4%	81.8%
Missing data	**(29)**	(10)	(3)	(10)	(2)	(2)	(2)
Final sample	**185**	49	4	69	19	28	16

Panel B. Sample based on survey and archival data

Description	Sample size
Total observations based on the survey data	185
Less survey observations with no archival data	(22)
Less observations with missing data for auditor and client characteristics	(38)
Observations available for final sample	**125**

This table describes the composition of our sample.

Table 2 Descriptive Statistics for the Scales Measuring Professional Skepticism

Measurement scale	Mean score	Standard deviation	Theoretical range	Actual range	Theoretical midpoint	Cronbach's alpha
HPS	141.33	9.72	30-180	114-165	105	0.83
PMC	83.85	10.26	15-105	60-105	60	0.91
RIT *(R)	75.13	8.96	25-125	54-111	75	0.79

This table summarizes the descriptive statistics for the professional skepticism measures. A total of 185 observations are used to calculate the descriptive statistics. See Appendix A for variables definitions.

*(R) We use the reverse of the score of the auditor on The Rotter Interpersonal Trust Scale to measure *RIT*, to capture distrust, a professional skepticism trait.

Table 3 Fraud Brainstorming Quality and Underlying Items

Item[a]	Overall [n=185]				High [n=91] versus Low [n=94] HPS		High [n=88] versus Low [n=97] PMC		High [n=85] versus Low [n=100] RIT	
	% Me.	% Std.	# Me.	# Std.	Δ[b]	Stat.	Δ[b]	Stat.	Δ[b]	Stat.
FBQ	**11.6**	**2.8**			**1.20**	**2.95*****	**1.59**	**3.98*****	**(.87)**	**2.11*****
Attendance and Communication										
LEADER_PTR_FS	.81	.39			(.06)	1.04	.01	.24	.00	.03
ATT_ALL_LVLS	.96	.20			.00	.05	.00	.14	.01	.49
ATT_FORENSIC	.05	.22			.03	1.07	.06	1.87**	.00	.09
ATT_IT	**.39**	**.49**			**.14**	**2.00****	**.10**	**1.43***	**(.05)**	**.63**
ATT_TAX	**.21**	**.41**			**.11**	**1.94****	**.17**	**2.94*****	**(.10)**	**1.63***
CONTR_STAFF			4.50	1.11	.43	2.50***	.41	2.43***	(.18)	1.06
CONTR_SENIOR			5.32	1.24	.25	1.11	.42	1.93**	(.13)	.58
CONTR_MAN			**5.89**	**.82**	**.34**	**2.80*****	**.50**	**4.21*****	**(.08)**	**.62**
CONTR_PTR			**5.79**	**.80**	**.27**	**2.26*****	**.45**	**3.82*****	**(.17)**	**1.43***
CONTR_FOREN			3.02	2.38	1.24	1.76**	1.59	2.27***	(1.2)	1.75**
PTR_OPEN			5.09	1.05	(.12)	.61	.21	1.03	.08	.38
Structure and Timing										
AGENDA	.88	.32			.04	.82	.03	.66	(.04)	.86
NO_CHECKLIST	.37	.48			(.02)	.28	(.13)	1.77**	(.04)	.52
TIMING_PPEP	.68	.47			.01	.17	.03	.50	.01	.21
TIMING_END_PY	**.15**	**.36**			**.07**	**1.32***	**.01**	**.28**	**.13**	**2.44*****
Engagement Team Effort										
HOURS_PREP			6.26	.83	1.46	1.11	2.08	1.59**	(.37)	.28
SESSIONS_MULT	.46	.50			.06	.79	.07	.91	(.10)	1.33*
SESSIONS_DUR			66	195	10	.34	53	1.79***	23	.77
LIST_PRIOR	**.57**	**.50**			**.07**	**.99**	**.17**	**2.42*****	**(.09)**	**1.26***
DISCUSS_MGT			**4.49**	**.83**	**.20**	**1.58****	**.24**	**1.86****	**(.03)**	**.28**
DISCUSS_RESP			4.48	.85	.10	.72	.26	2.01**	(.09)	.66

This table reports the overall mean and standard deviation and the difference in means [difference Δ = mean High – mean Low] of the measure of fraud brainstorming quality and the underlying items for the different professional skepticism measures, and the absolute t-statistic.

***, ** and * significant at .001, .05 and .10 level respectively based on the one-tailed p-value. Items in bold differ across more than one professional skepticism measure.

[a] See Appendix A for variables definitions. Observations with above (below) mean *HPS*, *PMC* and *RIT* are classified as "High" ("Low").

[b] Differences in parentheses indicate the mean of the respective variable is lower in the respective high *HPS*, *PMC* and *RIT* sample partition.

Table 4 Descriptive Statistics

Variable	Mean	Median	Std. Dev	Min	Max	Theoretical range
HPS	140.83	141	9.08	119	165	30 – 180
PMC	83.85	85	10.16	60	105	15 – 105
RIT	75.08	75	8.93	54	105	25 – 125
FBQ	12	12	2.99	6	20	0 – 21
FRAUDEXP	5.62	3	9.18	0	80	
MATMISEXP_cat	2.42	3	0.76	1	3	
AUDITEXP_cat	3.85	4	0.48	1	4	
CLIENTEXP	2.26	2	0.65	1	3	
TEAMEXP	4.94	5	0.77	3	7	1 – 7
TONE_AT_TOP	22.71	23	3.90	12	28	4 – 28
BUDGETPRESSURE	9. 55	9	3.09	3	19	3 – 21
TEAMSIZE	1.58	1	0.91	1	5	
FRAUDDETECT	.05	0	0.21	0	1	
MATMISDETECT	.08	0	0.27	0	1	
CLIENTIMPORTANCE	4.10	4	1.50	1	7	1 – 7
MANAGERCHANGE	.27	0	0.45	0	1	
SENIORCHANGE	.27	0	0.45	0	1	
OPENDISC	.86	1	0.35	0	1	
ROUNDROBIN	.25	0	0.43	0	1	
NOMINAL	.03	0	0.15	0	1	

This table reports the descriptive statistics of the variables in the regression model (n=125).
See Appendix A for variables definitions.

Table 5 Correlation Matrix

	FBQ	HPS	PMC	RIT	FRAUDEXP	MATMISEXP_cat	AUDITEXP_cat	CLIENTEXP	TEAMEXP	TONE AT TOP	BUDGETPRESSURE	TEAMSIZE	VIF
HPS	.3159*												1.56
PMC	.4063*	.4613*											2.05
RIT	- .1142	.0082	- .1543*										1.47
FRAUDEXP	.1222	.0779	.0241	.0971									1.39
MATMISEXP_cat	- .0318	.1255	- .0046	- .0327	.0724								1.40
AUDITEXP_cat	.0623	.1551	.2024*	- .0072	.1231	.1087							3.53
CLIENTEXP	.0500	.0094	.1291	- .1320	.0113	.1419	.1537						1.43
TEAMEXP	.3170*	.2689	.3752	- .1516	- .0398	- .0012	.0207	.0292					2.01
TONE_AT_TOP	.1224	.1483	.2300*	- .0168	- .1711*	- .0347	.0734	.0079	.1556				1.67
BUDGETPRESSURE	.0366	- .0852	- .0866	- .2108*	- .0875	- .0682	- .1018	- .0465	- .1011	- .2163*			1.72
TEAMSIZE	.3352*	.2000*	.1014	.1944*	- .1460	.0771	- .0169	- .0232	.1866*	.1375	.0688		2.04
FRAUDDETECT	.1130	.0373	.0830	- .0462	- .0397	.1232	- .0069	.0270	.0656	- .0509	.0329	.2273*	1.78
MATMISDETECT	.0990	.0558	- .0495	- .0591	- .0457	.1876*	- .0920	- .0715	- .0944	- .0542	.1294	.2333*	2.25
CLIENTIMPORTANCE	.3386*	.1442	.1319	- .1332	- .0499	- .0593	- .0795	- .0778	.2164*	- .0202	.2594*	.3346*	1.79
MANAGERCHANGE	.0724	.0980	.2007*	- .0840	- .1061	.0675	- .0315	.0920	- .0023	.1327	.2122*	.0426	1.67
SENIORCHANGE	.2232*	.1816*	.1197	- .0589	.1279	.0202	- .0315	- .0755	.0213	.0032	.2385*	.2015*	1.86
OPENDISC	- .0459	- .1112	- .0950	.0587	.1199	.0446	.0127	.0923	- .1497	- .1258	- .0439	.0381	1.85
ROUNDROBIN	.1741*	.1037	.0786	.0952	- .0752	- .0462	.0278	- .1420	.0422	.1342	.0091	.0183	1.99
NOMINAL	.2631*	- .0032	.0074	- .0894	- .0220	- .0170	.0503	.1000	.0115	.1190	- .0109	- .1012	1.33

(*continued on next page*)

This table presents the correlation matrix. * significant at .05 level. See Appendix A for variables definitions.

Table 5 Correlation Matrix (continued)

	FRAUDDETECT	MATMISDETECT	CLIENTIMPORTANC	MANAGERCHANGE	SENIORCHANGE	OPENDISC	ROUNDROBIN
MATMISDETECT	.4856*						
CLIENTIMPORTANCE	.1601	.1179					
MANAGERCHANGE	- .0532	.0186	.2469*				
SENIORCHANGE	.1151	.2174*	.2469*	.3132*			
OPENDISC	- .1211	.0370	- .0478	- .1589	- .1589		
ROUNDROBIN	.0444	.0355	.0594	.1902*	.3567*	- .5559*	
NOMINAL	- .0352	- .0462	.1293	- .0959	- .0959	.0643	.0310

This table presents the correlation matrix. * significant at .05 level. See Appendix A for variables definitions.

Table 6 Regression Results

Independent Variable	HPS only		PMC only		RIT only		Full model	
HPS	.057	*					.028	
	[1.77]						[0.88]	
PMC			.098	***			.083	***
			[3.28]				[2.55]	
RIT					-.049		-.038	
					[-1.56]		[-1.28]	
FRAUDEXP	.062		.062		.075	*	.063	*
	[1.57]		[1.65]		[1.90]		[1.75]	
MATMISEXP_cat	-.194		-.115		-.157		-.150	
	[-0.69]		[-0.37]		[-0.52]		[-0.49]	
AUDITEXP_cat	-.175		-.272		.024		-.300	
	[-0.32]		[-0.50]		[0.04]		[-0.57]	
CLIENTEXP	.067		-.052		-.098		-.121	
	[0.16]		[-0.13]		[-0.22]		[-0.30]	
TEAMEXP	.723	**	.378		.784	**	.267	
	[2.07]		[1.04]		[2.27]		[0.75]	
TONE_AT_TOP	.062		.039		.060		.032	
	[0.96]		[0.65]		[0.94]		[0.54]	
BUDGETPRESSURE	-.036		-.028		-.068		-.042	
	[-0.47]		[-.37]		[-0.87]		[-0.58]	
TEAMSIZE	.738	**	.869	***	.995	***	.956	***
	[2.24]		[2.79]		[2.71]		[3.21]	
FRAUDDETECT	-.130		-.789		-.015		-.586	
	[-0.09]		[-0.59]		[-0.01]		[-0.48]	
MATMISDETECT	1.017		1.299		.757		.945	
	[0.59]		[0.81]		[0.42]		[0.64]	
CLIENTIMPORTANCE	.393	**	.412	**	.337	**	.370	**
	[2.23]		[2.44]		[1.88]		[2.10]	
MANAGERCHANGE	.302		.087		.450		.146	
	[0.46]		[0.14]		[0.70]		[0.25]	
SENIORCHANGE	.126		.063		.097		-.044	
	[0.18]		[0.09]		[0.13]		[-0.07]	
OPENDISC	.659		.376		.692		.521	
	[1.00]		[0.55]		[1.12]		[0.75]	
ROUNDROBIN	.909		.916		1.038	*	1.056	*
	[1.55]		[1.56]		[1.73]		[1.80]	
NOMINAL	3.514	***	4.024	***	3.470	***	3.879	***
	[4.01]		[4.92]		[4.04]		[4.91]	
IND_dummies	INCL.		INCL.		INCL.		INCL.	
FIRM_dummies	INCL.		INCL.		INCL.		INCL.	
Constant	-4.493		-1.317		6.490		-.282	
	[-0.88]		[-0.41]		[1.52]		[-.05]	
R²	48.3%		52.4%		47.5%		53.7%	
N	125		125		125		125	

*, ** and *** significant at respectively .10, .05 and .01 level. See Appendix A for variables definitions. This table reports the coefficients, the t-statistics and the p-values, based on robust standard errors for the model: $FBQ = \beta_1 + \beta_2 HPS + \beta_3 PMC + \beta_4 RIT + \beta_5 FRAUDEXP + \beta_6 MATMISEXP\_cat + \beta_7 AUDITEXP\_cat + \beta_8 CLIENTEXP + \beta_9 TEAMEXP + \beta_{10} TONE\_AT\_TOP + \beta_{11} BUDGETPRESSURE + \beta_{12} TEAMSIZE + \beta_{13} FRAUDDETECT + \beta_{14} MATMISDETECT + \beta_{15} CLIENTIMPORTANCE + \beta_{16} MANAGERCHANGE + \beta_{17} SENIORCHANGE + \beta_{18} OPENDISC + \beta_{19} ROUNDROBIN + \beta_{20} NOMINAL + \beta_{21} INDUSTRY_{it} + \beta_{22} FIRM_{it} + \varepsilon_{it}$

Table 7 Additional Analyses

Panel A. Attendance and Communication

Independent Variable	*HPS* only	*PMC* only	*RIT* only	Full model
HPS	.034 *			.015
	[1.91]			[0.87]
PMC		.064 ***		.056 ***
		[3.81]		[3.11]
RIT			-.028	-.020
Controls Included			[-1.54]	[-1.19]
R²	43.2%	48.4%	42.3%	49.4%

Panel B. Structure and Timing

Independent Variable	*HPS* only	*PMC* only	*RIT* only	Full model
HPS	.010			.010
	[1.08]			[1.07]
PMC		.004		.000
		[0.40]		[-0.01]
RIT			-.003	-.003
Controls Included			[-0.39]	[-0.37]
R²	32.3%	31.4%	31.4%	32.4%

Panel C. Engagement Team Effort

Independent Variable	*HPS* only	*PMC* only	*RIT* only	Full model
HPS	.013			.004
	[0.78]			[0.21]
PMC		.030 *		.027
		[1.80]		[1.40]
RIT			-.018	-.015
Controls Included			[-1.09]	[-0.85]
R²	47.1%	48.8%	47.5%	49.3%

This table only reports the estimated coefficients for the professional skepticism traits of the regression analysis for the three underlying parts of fraud brainstorming quality, the t-statistics and the p-values, based on robust standard errors and other controls included. *, ** and *** significant at respectively .10, .05 and .01 level. See Appendix A for variables definitions.

APPENDIX A. VARIABLES DEFINITIONS

Variable Name	Description
Professional Skepticism Traits	
HPS	Auditor's score on the Hurtt Professional Skepticism Scale.*
PMC	Auditor's score on the Professional Moral Courage Scale.*
RITs	Reversed auditor's score on the Rotter Interpersonal Trust Scale.*
Fraud Brainstorming Quality	
FBQ	Brazel et al. (2010) measure of fraud brainstorming quality; calculated as the sum of the answers to the underlying 21 items: *LEADER_PTR_FS*, *ATT_[ALL_LVLS, FORENSIC, IT, TAX]*, *CONTR_[STAFF, SENIOR, MAN, PTR, FOREN]*, *PTR_OPEN*, *AGENDA*, *NO_CHECKLIST*, *TIMING_PPEP*, *TIMING_END_PY*, *HOURS_PREP*, *SESSIONS_MULT*, *SESSIONS_DUR*, *LIST_PRIOR*, *DISCUSS_MGT*, *DISCUSS_RESP*.
AGENDA	Dichotomous variables equal to 1 if an agenda was used during fraud brainstorming; 0 otherwise.
ATT_[ALL_LVLS, FORENSIC, IT, TAKS]	Dichotomous variables equal to 1 if the session was attended by [all levels of the engagement team, forensic specialist, IT specialist, tax professional]; 0 otherwise.
CONTR_[STAFF, SENIOR, MAN, PTR, FOREN]	The relative levels of [staff, senior, manager, partner, forensic specialist] contribution to the session on a scale from 1 (very low contribution) to 7 (very high contribution); to measure fraud brainstorming quality, a dichotomous variable is created which is equal to 1 if the perceived level of contribution of the [staff, senior, manager, partner, forensic specialist] is greater than the sample mean; 0 otherwise.
DISCUSS_[MGT, RESP]	The extent of discussion during the session about [how management might perpetrate fraud, audit responses to fraud risk] on a scale from 1 (no discussion at all) to 7 (extreme amount of discussion); to measure fraud brainstorming quality, a dichotomous variable is created which is equal to 1 if the extent of discussion is greater than the sample mean; 0 otherwise.
HOURS_PREP	The hours spent by the engagement team preparing for fraud brainstorming; to measure fraud brainstorming quality, a dichotomous variable is created which is equal to 1 if the number of hours is greater than the sample mean; 0 otherwise.
LEADER_PTR_FS	Dichotomous variables equal to 1 if the session was led by the audit partner or a forensic specialist; 0 otherwise.

Variable Name	Description
LIST_PRIOR	Dichotomous variables equal to 1 if the participant developed a list of fraud risks prior to brainstorming with the group; 0 otherwise.
NO_CHECKLIST	Dichotomous variables equal to 1 if no checklist was used during fraud brainstorming; 0 otherwise.
PTR_OPEN	Participant's rating of the engagement partner's openness to ideas submitted during fraud brainstorming on a scale from 1 (extremely low level of openness) to 7 (extremely high level of openness); to measure fraud brainstorming quality, a dichotomous variable is created which is equal to 1 if the openness is greater than the sample mean; 0 otherwise.
SESSIONS_DUR	The number of minutes spent in fraud brainstorming; to measure fraud brainstorming quality, a dichotomous variable is created which is equal to 1 if the number of minutes is greater than the sample mean; 0 otherwise.
SESSIONS_MULT	Dichotomous variables equal to 1 if more than one fraud brainstorming session was held by the engagement team; 0 otherwise.
TIMING_[PPEP, END_PY]	Dichotomous variables equal to 1 if fraud brainstorming occurred [at the end of the prior year's audit, pre-planning or early in planning]; 0 otherwise.
Control Variables	
AUDITEXP_cat	Number of years, coded as follows: 1 = 0–4 years, 2 = 5–10 years, 3 = 11–15 years, 4 = > 16 years.
BUDGETPRESSURE	Measure of time budget pressure on a scale from 1 (strongly disagree) to 7 (strongly agree); measured as the sum of the answers to the underlying 3 items.*
CLIENTEXP	The number of years served as an engagement partner for this client, coded as follows: 1 = 0 years (first year), 2 = 1–3 years, 3 = 3–7 years.
CLIENTIMPORTANCE	The importance of a client on a scale from 1 (not at all important) to 7 (extremely important).
FRAUDDETECT	Dichotomous variables equal to 1 if fraudulent financial reporting has been detected at the client during the past three years; 0 otherwise.
FRAUDEXP	The number of engagements the participant served on in which fraudulent financial reporting was identified.
MANAGERCHANGE	Dichotomous variables equal to 1 if the lead engagement manager changed from the prior year; 0 otherwise.

Variable Name	Description
MATMISDETECT	Dichotomous variables equal to 1 if material misappropriation of assets has been detected at the client during the past three years; 0 otherwise.
MATMISEXP_cat	The number of engagements the participant served on in which material misappropriation of assets was identified, coded as follows: 1 = 0 engagements, 2 = 1–2 engagements, 3 = > 2 engagements.
NOMINAL	Dichotomous variables equal to 1 if the nature of the format of the discussion for fraud brainstorming is nominal; 0 otherwise.
OPENDISC	Dichotomous variables equal to 1 if the nature of the format of the discussion for fraud brainstorming is open discussion; 0 otherwise.
ROUNDROBIN	Dichotomous variables equal to 1 if the nature of the format of the discussion for fraud brainstorming is round robin; 0 otherwise.
SENIORCHANGE	Dichotomous variables equal to 1 if the lead engagement senior changed from the prior year; 0 otherwise.
TEAMEXP	The perception of the entire engagement team's level of expertise on this client on a scale from 1 (extremely low level of expertise) to 7 (extremely high level of expertise).
TEAMSIZE	Number of financial statement auditors assigned to the engagement, coded as follows: 1 = 1–5 auditors, 2 = 6–10 auditors, 3 = 11–15 auditors, 4 = 16–20 auditors, 5 = > 20 auditors.
TONE_AT_TOP	Sweeney et al. (2010) measure of perceived unethical tone at the top on a scale from 1 (disagree strongly) to 7 (strongly agree); measured as the reverse of the sum of the answers to the underlying 4 items.*

* See underlying items in Appendix B

APPENDIX B. MEASUREMENT SCALES

HURTT PROFESSIONAL SKEPTICISM SCALE (HPS)

The Hurtt Professional Skepticism Scale (Hurtt 2010) consists of 30 items scored on a 6-point scale, ranging from 1 (strongly disagree) to 6 (strongly agree). The items of which the scores should be reversed are indicated by (r). A higher total score indicates greater trait skepticism.

1. I often accept other peoples' explanations without further thought. (r)
2. I feel good about myself.
3. I wait to decide on issues until I can get more information.
4. The prospect of learning excites me.
5. I am interested in what causes people to behave the way that they do.
6. I am confident of my abilities.
7. I often reject statements unless I have proof that they are true.
8. Discovering new information is fun.
9. I take my time when making decisions.
10. I tend to immediately accept what other people tell me. (r)
11. Other peoples' behavior doesn't interest me. (r)
12. I am self-assured.
13. My friends tell me that I usually question things that I see or hear.
14. I like to understand the reason for other peoples' behavior.
15. I think that learning is exciting.
16. I usually accept things I see, read or hear at face value. (r)
17. I don't feel sure of myself. (r)
18. I usually notice inconsistencies in explanations.
19. Most often I agree with what the others in my group think. (r)
20. I dislike having to make decisions quickly.
21. I have confidence in myself.
22. I don't like to decide until I've looked at all of the readily available information.
23. I like searching for knowledge.
24. I frequently question things that I see or hear.
25. It is easy for other people to convince me. (r)
26. I seldom consider why people behave in a certain way. (r)
27. I like to ensure that I've considered most available information before making a decision.
28. I enjoy trying to determine if what I read or hear is true.
29. I relish learning.
30. The actions people take and the reasons for those actions are fascinating.

PROFESSIONAL MORAL COURAGE SCALE (PMC)

The Professional Moral Courage scale (Serkerka et al., 2009) consists of 15 Items scored on a 7-point scale, ranging from 1 (never true) to 7 (always true). Respondents are asked to evaluate these statements as they pertain to them at work. Adding up the points for each item and dividing the total by 15 provides the moral courage score. A higher total score indicates greater moral courage and willingness to take skeptical action.

1. I am the type of person who is unfailing when it comes to doing the right thing at work.
2. When I do my job I regularly take additional measures to ensure my actions reduce harms to others.
3. My work associates would describe me as someone who is always working to achieve ethical performance, making every effort to be honorable in all my actions.
4. I am the type of person who uses a guiding set of principles from the organization as when I make ethical decisions on the job.
5. No matter what, I consider how both my organization's values and my personal values apply to the situation before making decisions.
6. When making decisions I often consider how my role in the organization, my command, and my upbringing must be applied to any final action.
7. When I encounter an ethical challenge I take it on with moral action, regardless of how it may pose a negative impact on how others see me.
8. I hold my ground on moral matters, even if there are opposing social pressures.
9. I act morally even if it puts me in an uncomfortable position with my superiors.
10. My coworkers would say that when I do my job I do more than follow the regulations, I do everything I can to ensure actions are morally sound.
11. When I go about my daily tasks I make sure to comply with the rules, but also look to understand their intent, to ensure that this is being accomplished as well.
12. It is important that we go beyond the legal requirements but seek to accomplish our tasks with ethical action as well.
13. It is important for me to use prudential judgment in making decisions at work.
14. I think about my motives when achieving the mission, to ensure they are based upon moral ends.
15. I act morally because it is the right thing to do.

ROTTER INTERPERSONAL TRUST SCALE (RIT)

Rotter's Interpersonal Trust scale consists of 25 items that are scored on a 5-point Likert Scale (varying from strongly disagree to strongly agree). We gathered scale items from Wrightsman (1991). The items of which the scores should be reversed are indicated by (r). Adding up the points for each item provides the interpersonal trust score. Higher scores indicate higher interpersonal trust. We use the reversed score on Rotter's Interpersonal Trust Scale to measure distrust; higher scores indicate greater distrust.

1. Hypocrisy is on the increase in our society. (r)
2. In dealing with strangers one is better off to be cautious until they have provided evidence that they are trustworthy. (r)
3. This country has a dark future unless we can attract better people into politics. (r)
4. Fear and social disgrace or punishment rather than conscience prevents most people from breaking the law. (r)
5. Using the honor system of not having a teacher present during exams would probably result in increased cheating. (r)
6. Parents usually can be relied on to keep their promises.
7. The United Nations will never be an effective force in keeping world peace. (r)
8. The judiciary is a place where we can all get unbiased treatment.
9. Most people would be horrified if they knew how much news that the public hears and sees is distorted. (r)
10. It is safe to believe that in spite of what people say most people are primarily interested in their own welfare. (r)
11. Even though we have reports in newspapers, radio, and TV, it is hard to get objective accounts of public events. (r)
12. The future seems very promising.
13. If we really knew what was going on in international politics, the public would have reason to be more frightened than they now seem to be. (r)
14. Most elected officials are really sincere in their campaign promises.
15. Many major national sports contests are fixed in one way or another. (r)
16. Most experts can be relied upon to tell the truth about the limits of their knowledge.
17. Most parents can be relied upon to carry out their threats or punishments.
18. Most people can be counted on to do what they say they will do.
19. In these competitive times one has to be alert or someone is likely to take advantage of you. (r)
20. Most idealists are sincere and usually practice what they preach.
21. Most salesmen are honest in describing their products.
22. Most students in school would not cheat even if they sure of getting away with it.
23. Most repairmen will not overcharge even if they think you are ignorant of their specialty.
24. A large share of accident claims filed against insurance companies are phony. (r)
25. Most people answer public opinion polls honestly.

AUDIT FIRM TONE AT THE TOP

We measure the relative extent of audit firm ethical tone at the top based on Sweeney et al. 2010, whereby the measure consists of 4 items scored on a 7-point Likert scale (varying from strongly disagree to strongly agree). The items of which the scores should be reversed are indicated by (r). We use the reversed score to measure tone at the top. Higher scores indicate a more ethical perceived tone at the top.

To what extent do you agree with the following statements?

1. In my firm, I sometimes perceive that senior managers engage in behaviors that I consider to be unethical. (r)
2. In my firm, I sometimes perceive that partners engage in behaviors that I consider to be unethical. (r)
3. In my firm, top management has let it be known in no uncertain terms that unethical behaviors will not be tolerated.
4. My firm is known as a leader in promoting professional ethics within the profession.

TIME BUDGET PRESSURE

Time budget pressure consists of 3 items scored on a 7-point Likert Scale (varying from strongly disagree to strongly agree). The items of which the scores should be reversed are indicated by (r). Adding up the scores results in a score for perceived pressure. Higher scores indicate a higher perceived pressure.

To what extent do you agree with the following statements?

1. I felt pressure from the budget I was working on.
2. I felt that the time budget was unattainable.
3. I finished my work within the allotted time budget. (r)