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Literature Review
Engaging Auditors' Innovation Mindset to Mitigate Goal Conflict and Improve Audit Effectiveness with Data Analytics: Thinking Outside of the Box

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What is our research question?

In this study, we examine whether auditors' cognitive flexibility and overall audit effectiveness improves when auditors engage an innovation mindset and provide operational insights to the client during the course of a data analytics-enabled audit.

Introduction

Advancements in technology and data analytics are changing the landscape of financial reporting and auditing (Trentmann 2017). Investments by companies in data analytics are projected to grow to more than $274 billion in the next few years (IDC 2019), and audit firms are committed to investing an unprecedented $9 billion in data analytics and technology (e.g., see Harris 2017; Deloitte 2016; 2019; EY 2018; KPMG 2019; Maurer 2019; PwC 2019; Bloomberg 2020). However, little is known about the impact of data analytics on auditors' judgments about financial statement misstatements or fraud and practitioners, regulators, and academics alike call for research in this area (CAQ 2020; SEC 2019; IAASB 2018a; PCAOB 2017a; Alles 2015; Schneider et al. 2015). The Public Company Accounting Oversight Board's (PCAOB) recent research spotlight (PCAOB 2020) echoes this sentiment highlighting the need to "anticipate and respond to these innovations and their corresponding opportunities and risks" (p. 1). Accordingly, they call for future research focusing on: "Obtaining a more in-depth understanding of how auditors are using technology-based tools in responding to identified risks of material misstatement" (PCAOB 2020, p. 2).

Accounting regulators and standard setters continue to emphasize the importance of auditors' professional skepticism with respect to misstatements both to error and fraud (e.g., IAASB 2018b; IFIAR 2015; PCAOB 2017b). For example, the PCAOB notes deficiencies in auditors' professional skepticism and responses to material misstatement due to fraud (PCAOB

2007, 2010, 2014, 2015). Data analytics have been widely praised as particularly powerful when it comes to revealing suspicious patterns in the data that could point to financial statement misstatements and fraudulent activity. Thus firms are increasingly relying on data analytics (e.g., FRC 2017; Earley 2015) and integrating these data analytics into their audit work programs and documentation (Austin, Carpenter, Christ, and Nielson 2021). However, the potential of data analytics is contingent on users' ability to effectively examine and interpret data analytic output. In other words, if a user lacks the technological expertise and mindset necessary to understand and interpret data analytic output, then the power of data analytics is diminished.

The PCAOB cautions that the use of data analytics requires the development of appropriate competencies and skills to evaluate the results of data analyses. Huerta and Jensen (2017) suggest that a common theme that continues to emerge in data analytics from both practitioners and academics is the importance of creativity. They suggest that individuals need to be able to think creatively when analyzing the data to develop a clear understanding of the data and formulate new insights. Indeed, several Big Four audit firms now include an *innovation mindset* as a key trait for their professionals. Further, the Center for Audit Quality (CAQ) suggests that auditors need to engage an innovation mindset, which includes an ability to generate creative or novel solutions to problems and flexibility and agility in their thinking, to effectively examine and interpret data analytic output (CAQ 2018).

In our project, we argue that an innovation mindset enhances *cognitive flexibility,* which is an important condition for the effective use of data analytics. The psychology literature defines cognitive flexibility as "the ease with which people can switch to a different approach or consider a different perspective" (Nijstad, De Dreu, and Rietzschel 2010, p. 42). Accordingly, in this study, we investigate how an innovation mindset, can increase auditors' cognitive flexibility, leading to

enhanced professional skepticism and more effective identification of novel and useful audit procedures aimed at identifying fraud thereby increasing audit quality.

Further, while auditors' primary goal is obtaining high audit quality, when using data analytics, auditors are often encouraged to also provide value-added insights to the client throughout the course of the audit (Austin et al. 2021, PwC 2018). For example, Austin et al. 2021 quote a senior manager from a Big Four audit firm describing these insights,

> "Rather than focusing only on misstatements or control deficiencies, we can provide observations about the client's processing of transactions or areas of operational risks that provide value beyond the audit opinion. Our unique perspective as the auditor and our ability to capture and analyze large populations of data puts us in a unique position to see things management might not be able to see from their vantage point. (p. 39)"

This adds a new goal into auditors' already crowded set of goals, which includes audit quality, efficiency, client service, etc. (Griffith, Kadous and Young 2015), and prior research suggests that the introduction of additional goals can decrease one's performance on existing goals (Christ, Emmett, Tayler, and Wood 2006; Kachelmeier, Reichert, and Williamson 2008).

Hence, we examine whether (1) prompting an innovation mindset will enhance auditors' cognitive flexibility and improve audit judgments, (2) encouraging auditors to identify value-added insights for their clients during the course of the audit impairs their professional skepticism, thereby inadvertently decreasing audit quality, and whether (3) the innovation mindset prompt mitigates the adverse effects of conflicting goals triggered by the potentially conflicting goal of encouraging auditors to identify client insights. We draw from psychology theory on creativity and cognitive flexibility (e.g., Feldman and Pentland 2003; Salvato and Rerup 2018) and investigate whether triggering cognitive flexibility among auditors when performing the audit work programs that incorporate data analytics can improve their ability to manage their competing

goals so that they can maintain appropriate levels of professional skepticism and conduct a high-quality audit.

Data analytics is a powerful tool that can turn data into meaningful information that tells a story. However, if the user lacks the necessary mindset to interpret that story, the power of data analytics is lost. While audit firms are investing heavily in data analytic tools (FRC 2017; EY 2017), firms are still in the early stages of developing these tools for use in the audit (CAQ 2017). However, much of the prior literature in this area consists of thought pieces calling for research to examine the uses, benefits, and costs of data analytics (Alles 2015; Applebaum et al. 2017; Brown-Liburd et al. 2015; Cao et al. 2015; FEI 2014; Rose et al. 2017; Yoon et al. 2015). Encouragingly, recent accounting literature finds that data analytics can be used to identify fraud more effectively than the leading techniques used in the academic literature (Perols, Bowen, Zimmerman and Samba 2017). We contribute to the accounting literature and audit practice by being one of the first studies to investigate how an innovation mindset that includes flexibility can help to resolve the bias created by the goal conflict that auditors may face when using data analytics as they provide client advice in addition to performing the audit.

Theory and Predictions

We first review the psychology and accounting literature on adverse effects of goal conflict, and how this problem applies to auditing and, more specifically, auditors' use of data analytics. We then move on to review the literature on cognitive flexibility, which underlies our predictions related to how an innovation mindset could (1) improve auditor judgment and (2) mitigate adverse effects of conflicting goals.

Auditors' Conflicting Goals

Psychology research defines a goal as an internal representation of a desired state (i.e., outcome, event or process) not yet obtained (Austin and Vancouver 1996). People set a wide range of goals throughout their lives and vary these goals in complexity, topic area and duration (e.g., learning to ride a bicycle versus earning a PhD). As a result, people experience multiple goals concurrently and often these goals compete for the same resources. Researchers label this competition for resources as "goal conflict" and find it results in decreased goal-related performance (Kehr 2003). This decrease in performance results from a shift in cognitive resources from goal realization of a single goal to self-regulation amongst several goals (Kehr 2003). Psychology studies on goal conflict find that priming a secondary goal that indirectly conflicts with a primary goal will decrease performance on the primary goal task (Shah and Kruglanski 2002).

Auditors maintain a varied goal set to meet the multifaceted demands of their profession. These goals include avoiding litigation risk, completing audits within the budgeted amount of time, and reaching conclusions that agree with their supervisors' preferences (Griffith et al. 2015). As with any set of different goals, the potential for conflict exists amongst auditors' goals. Prior accounting studies support the psychology literature finding that a person's performance towards a primary goal decreases with the introduction of a secondary goal. For example, Christ et al. (2016) examine how employees approach conflicting goals in a multidimensional task when motivated by either feedback or compensation. These authors find that when employees receive compensation based upon one goal and feedback based upon another goal, they perform better than when compensated based upon all dimensions. Another study (Kachelmeier et al. 2008) examines employees' performance when compensated on quality and quantity goals versus a

quantity goal alone and find that performance declines when compensating employees on both quantity and quality goals rather than a quantity goal alone. However, accounting research has yet to fully explore how conflicting goals affect auditor judgments (Griffith et al. 2015).

The use of data analytics enables auditors to find operational efficiencies for their clients during the course of normal audit work. For example, one Big Four audit partner described data analytics in a recent interview study (Austin et al. 2021) as "a way to provide more value-added advice to our clients" by sharing knowledge about the client's business "[the client] might not otherwise have been privy to." Identifying value-added client insights is not typically among auditors' primary goals, and regulators raise concerns about whether doing so may cause independence concerns. However, the examination of complete sets of data with data analytics tools during the audit enhances auditors' ability to provide client insights into the operations of their business as a byproduct of the audit (Austin et al. 2021). This newfound ability to discover insights into their clients' businesses and a push to add value to clients through data analytics however creates the potential for a goal conflict for auditors: audit quality versus adding value to clients. Hence, providing value-added advice to clients through data analytics introduces another goal into auditors' already crowded set of goals (Griffith et al. 2015). Unlike other situations in which auditors face conflicting goals and must choose between two tasks or deciding whether or not to perform a task, the conflict between adding value to clients and maintaining audit quality exists within a single task and importantly, the decision making now resides in one individual. As prior research finds, the introduction of an additional goal often decreases one's performance on existing goals (Christ et al. 2016; Kachelmeier et al. 2008).[1] Thus, the (implicit or explicit) goal

[1] Using an experiment, Christ et al. (2016) ask employee participants to provide output (i.e., typing lines of text) that is both high quality and high quantity. In Kachelmeier et al. (2008) employee participants are asked to create rebus puzzles with two goals, quantity and creativity.

to add value to their client through data analytics may inhibit auditors' performance of audit tasks, such as detecting material misstatements due to fraud, because this new goal will cause auditors to experience goal conflict. This state of goal conflict will impede auditors' ability to meet their primary goal of high-quality audit judgments.

Our prediction aligns with prior psychology and accounting research findings that people perform tasks to achieve their primary goal less well when a secondary goal is introduced. Thus, we predict that adding the goal to add value to their client through data analytics will negatively affect auditor judgment.

Mitigating Negative Effects of Goal Conflict

Recent management literature in conflicting goals notes two ways to resolve goal conflicts: (1) separating conflicting goals across space or time and (2) creating a new routine to meet the demands of conflicting goals (Salvato and Rerup 2018). Management literature defines a routine as a "repetitive, recognizable pattern of interdependent actions" (Feldman and Pentland 2003). An audit represents a complex routine as audit engagements include multiple actors completing several interdependent tasks with multiple goals. Given the inherent time and resource constraints of an audit engagement, it is unlikely that auditing firms can reasonably separate conflicting goals across personnel or time (i.e., adding more hours to the audit). Thus, in this study, we examine how priming a creative mindset can address auditors' conflicting goals.

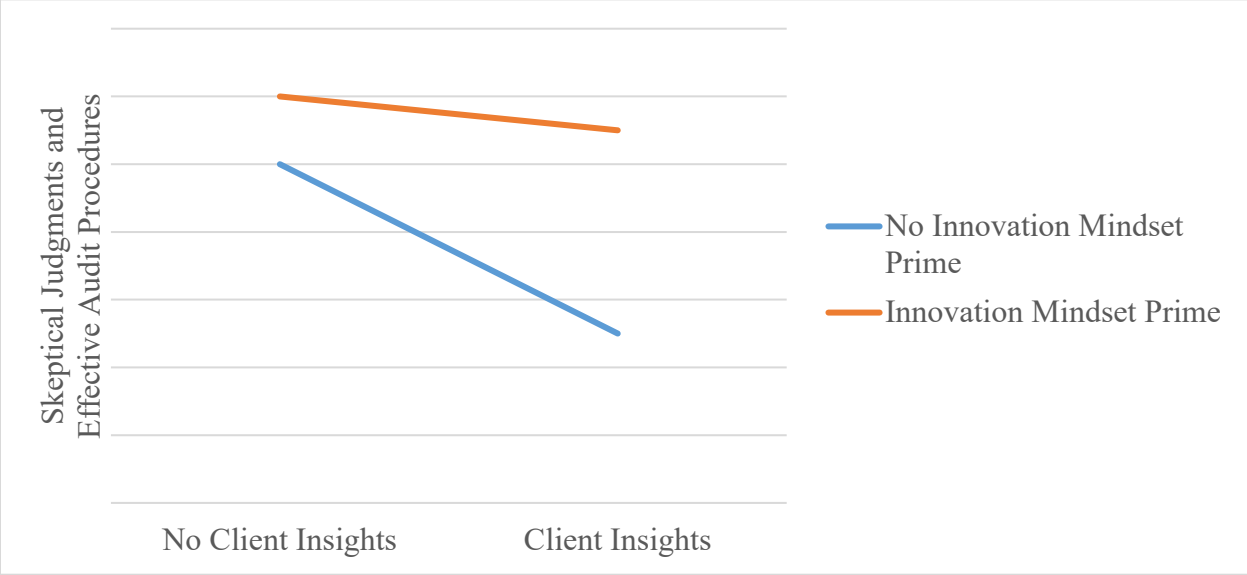
To accommodate conflicting goals, individuals require increased (cognitive) flexibility (Salvato and Rerup 2018). Individuals in a task can reduce the difference between conflicting goals by allowing for "areas of behavioral discretion" (Nelson and Winter 1982) within a routine that allow flexibility to individual actors in the routine (Salvato and Rerup 2018). While auditing firms tailor the nature, timing and extent of testing in a risk-based audit, the limits of consistent

documentation of insights from data analytics establish boundaries for adjustments to maintain consistent quality levels across the firm, thereby reducing flexibility. As discussed, these boundaries can detrimentally affect auditors' judgments. Creative idea generation helps individuals' problem solving (Mumford and Gustafson 1988) and aids individuals' flexibility (Flach 1990; De Dreu, Baas, and Nijstad 2008; Nijstad et al. 2010)). Creativity is often defined as the generation of ideas, problem solutions and insights that are both novel and useful (Amabile 1983; Paulus and Nijstad 2003; Sternberg and Lubart 1999). Thus, psychology research on creativity operationalizes it with measures of fluency, originality and flexibility. Fluency is a measure of creative production of ideas and is typically captured by the number of non-redundant ideas, problem solutions or insights (De Dreu et al. 2008). Originality is the uncommonness, or infrequency of ideas being generated (Amabile 1983). Flexibility is the use of different cognitive categories, perspectives, and broad and inclusive cognitive categories (De Dreu et al. 2008). Generating ideas in different categories is associated with more ideas overall and with increased fluency (Nijstad, Stroebe, and Lodewjkx 2003), as well as originality (Murray, Sujan, Hirt and Sujan 1990). Importantly, flexibility is not only a measure of creative performance, but also a cognitive process, as researchers suggest that individuals must think flexibly if they are to be creative (Smith and Blankenship 1991; Smith, Ward and Schumaker 1993). Drawing upon the management literature, we predict that, for auditors experiencing goal conflict, auditors' performance will improve if flexibility within the audit increases. As the audit routine becomes more flexible, it will allow for auditors to consider both goals during completion of their audit work. Our study fills a gap in the auditing literature by examining an intervention – creating an innovation mindset to mitigate negative effects due to goal conflict in the use of data analytics.

Creating an Innovation Mindset

We draw insights from Austin et al.'s (2020) interview study that suggests that auditors may not yet display the creativity, critical thinking and problem-solving skills necessary to effectively use data analytics for fraud detection. Our experiment tests a creativity intervention based on psychology theory and management accounting research on creativity and problem solving (e.g., Liu, Jiang, Shalley, Keem, Zhou 2016; Kachelmeier et al. 2008; Kachelmeier and Williamson 2010; Sassenberg and Moskowitz 2005; De Dreu et al. 2008) that can be used in this new data analytic environment to improve auditors' professional skepticism. As discussed, several parties suggest that critical thinking is required to interpret the output from data analytics (CAQ 2018; IAASB 2016). However, creativity is not a typical skill for most auditors, even though the profession calls for an innovation mindset. In addition, Brown-Liburd et al. (2015) warn that data analytics tools have the potential to overload users with information, and psychology theory suggests that information overload can stifle creativity (Shalley 1991). Recent psychology research suggests that priming creativity is complex, as some attempts at creative idea generation result in restricted creativity (Sassenberg, Moskowitz, Fetterman, and Kessler 2017). Indeed, this reduced creativity is often due to responses being tied tightly to recently activated knowledge and salient examples, thus restricting the individual to think freely and creatively (Sassenberg et al. 2017). However, this recent research provides promise as it finds that priming creativity can result in more creativity (i.e., flexibility), suggesting that priming an innovation mindset can overcome restrictions of individual's processing that cannot be overcome by conscious intentions and can mitigate biases associated with automatic effects (Sassenberg et al. 2017). Creative ideation allows individuals to remain flexible, and to cope with opportunities, technology and changes that are part of decision-making (De Dreu et al. 2008; Flach 1990; Runco 2004). Based on theory in

psychology, we expect that engaging auditors' innovation mindset by priming creativity has the potential of countering the bias created by providing client insights. Hence, we predict that engaging auditors' innovation mindset will improve their professional skepticism and identification of novel and effective audit procedures.



Experimental Design

To test our predictions, we will conduct a 2 x 2 between-participants experiment in which participants use data analytic output to perform a simulated audit task. In our experiment, we manipulate two independent variables: multiple goals (i.e., audit quality and client insights vs. audit quality only) and innovation mindset (primed vs not). First, we will manipulate conflicting goals at two levels: conflicting-goals versus no conflicting-goals. Participants in the conflicting-goals condition will receive a prompt to focus on both audit quality and to identify operational insights when completing the audit task. Participants in the single goal condition will receive a prompt to focus on audit quality when completing the audit task. Second, we will manipulate the innovative mindset variable at two levels: innovation mindset prime and no innovation mindset prime. In particular, all participants will receive a message about their firm's philosophy ("Think

BEAN!"). For participants in the innovation mindset prime condition, this philosophy focuses on innovation and creativity in addition to audit quality and competence. In the no innovation mindset prime condition, the philosophy only focuses on audit quality and competence.[2] After learning their firm's philosophy, participants are asked to "List three ways you can embrace the "Think Bean!" mindset on the job. This technique is used in psychology research to help strengthen manipulations. Participants are reminded of the firm philosophy periodically throughout the experiment.

Our main dependent measures will be auditors' fraud risk assessments, whether they appropriately recommend audit procedures that would facilitate fraud detection (i.e., requesting additional data, suggesting additional analysis), and underlying process measures that relate to participants' cognitive flexibility and creativity, including goal conflict, positive affect, cognitive closure, need for cognition and their views of independence. We will also count participants' value-added insights into the client's business. We will engage a panel of audit partners and/or senior managers to evaluate the modified procedures and insights suggested by auditor participants to determine their novelty and the usefulness.

Conclusion and Contributions

Our study makes three primary contributions to the literature and practice. First, by examining the joint effect of auditors providing client insights and engaging their creative mindset while using data analytics, we answer the calls for research that provides a deeper understanding

[2] "Think Bean!" is an acronym that varies by condition. In the innovation mindset condition it stands for "Be creative, Embrace risk taking, Applaud innovation and Need to educate and collaborate." In the no innovation mindset condition it stands for " Be focused and excel, Embrace efficiency and effectiveness, Applaud competence, and Need to educate and communicate." Analysis of preliminary data shows that participants in the innovation mindset condition rate their firm higher on innovation than do participants in the no innovation mindset condition. However, there are no differences across conditions for their ratings on whether the Bean provides a high quality audit.

of auditors' judgments when they use data analytics. Second, by examining the potential for conflicting goals that arise as a result of auditors' new opportunities to provide client insights with data analytics, we highlight the importance of professional skepticism and independence when auditors use these new tools. Third, we contribute to the ongoing discussion about how auditors might improve their professional skepticism by engaging an innovation mindset and improving cognitive flexibility. In sum, our study contributes to academic research, practice, and regulation by providing insights into this new world of data analytics as we seek to better understand conflicting goals that auditors may face and the benefits of auditors' innovation mindsets at mitigating these potential conflicts resulting in improved cognitive flexibility and professional skepticism.

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