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An error management perspective on audit quality: Toward a multi-level model

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ABSTRACT

We take an error management perspective on audit quality. Drawing on 18 months of participant observations and 38 interviews conducted in a Big 4 accounting firm, we develop a multi-level model of error management. With this model, we propose how organizational structures, team procedures and practices, and individual cognitions and emotions interact to manage errors. The multi-level model of error management allows us to conceptually integrate previous behavioral and social research on audit quality, contributes to the rising accounting firm error management literature, and explains how and why two general approaches from the broader error management literature to errors that are usually considered as opposing each other, i.e., error prevention and error resilience, may interact and actually entail each other in accounting firms.

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1. Introduction

How can we explain the differences in provided audit quality? This question has attracted considerable attention in the accounting literature since DeAngelo's seminal theoretical papers on this topic (DeAngelo, 1981a, 1981b). A substantial body of empirical research has emerged and converged, primarily around two approaches. A first and very popular approach to studying audit quality is embedded in the archival research stream. It assumes that the audit's context plays a decisive role in determining audit quality. Archival researchers have studied the influence of legal regulations (e.g., Francis & Wang, 2008), professional self-regulation (e.g., Grant, Bricker, & Shiptsova, 1996), accounting firm size (e.g., Francis & Yu, 2009), non-audit services (Firth, 1997), low-balling (e.g., DeAngelo, 1981a), auditor tenure (e.g., Carey & Simnett, 2006), client corporate governance (e.g., Lennox & Pittman, 2010), and the auditor's industry specialization (e.g., Dunn & Mayhew, 2004). Together, these archival studies have considerably advanced our understanding of how an audit's context influences audit quality. However, one main limitation of this approach is that it treats accounting firms mostly as a 'black box' (Francis, 2011; Hopwood, 1996). Thus, the specific mechanisms within the audit firm that may explain variances remain vague.

To understand the mechanisms within the 'black box,' a second approach to empirical audit quality research is embedded in the behavioral and social research stream. This stream uses social and cognitive psychology lenses to understand auditors' behaviors, cognitions, and emotions (Birnberg & Shields, 1989), along with sociological lenses for making sense of the influence of social structures, institutions, and roles on auditors' behavior (e.g., Cooper & Robson, 2006; Miller, 1994). Scholars following this stream have studied, e.g., the influence of quality control structures on auditors' behavior (e.g., Malone & Roberts, 1996), the role of workpaper reviews (e.g., Ramsay, 1994), auditors' judgment and decision making (JDM) (e.g., Bonner, 2008; for a review), the error management climate (e.g., Gold, Gronewold, & Salterio, 2014), and how social structures and agentic behavior reciprocally interact (e.g., Barrett, Cooper, & Jamal, 2005; Dirsmith, Heian, & Covaleski, 1997). One major contribution of the behavioral and social research stream is that it indicates the relevance of interactions of different levels of analysis within the organization to explain differences in audit quality (e.g., Barrett et al., 2005; Malone & Roberts, 1996). However, we argue that a crucial issue in this stream is not a lack of singular studies that investigate how particular organizational structures and procedures influence and interact with individual auditors' behaviors. Rather, a key issue is that there is little conceptual integration of how this interaction across multiple levels of analysis

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evolves over time and can be systematically explained.

Our study explores the relatively neglected multi-level interaction in the production of audit quality by importing insights from the broader error management literature (Goodman et al., 2011; Perrow, 1984; Weick, Sutcliffe, & Obstfeld, 1999). Error management is used as an umbrella term for organizations' joint efforts to prevent and handle occurring errors (Goodman et al., 2011). Error management has been highlighted as a key to understanding the production of quality in the wider fields of psychology, management, and sociology (Frese & Keith, 2015; Hofmann & Frese, 2011b; Perrow, 1984; Weick et al., 1999). Recently, it has also been introduced in the accounting field (Gold et al., 2014; Gronewold & Donle, 2011; Gronewold, Gold, & Salterio, 2013). The base literature on error management[1] is divided into two—largely unreconciled—main camps: error prevention and error resilience (Goodman et al., 2011; Weick et al., 1999). Whereas advocates of the error prevention camp emphasize the role of formal structures and procedures in preventing errors and their accumulation, advocates of the error resilience camp stress the role of individual resilience and informal (shared) practices to quickly address errors (Goodman et al., 2011). However, despite this divide between the two camps, we contend that both may offer valuable insights for understanding various aspects of error management on different levels of analysis.

Theoretically informed by the base literature on error management, we empirically investigate the multi-level interaction in audit error management based on an in-depth case study of a Big 4 accounting firm. Based on 18 months of participant observations (over three busy seasons in three consecutive years), 38 interviews, and the firm's internal archival materials, we examine the interplay between organizational structures, team activities (i.e., procedures and practices), and individual characteristics regarding error management. We focus on the management of audit (not accounting) errors mainly at the audit team level. However, we move one level down (i.e., individual level) and up (i.e., organizational level) to examine both how individual characteristics influence team activities and how organizational structures enable and constrain these activities (e.g., Hackman, 2003). The case study findings are condensed in a multi-level model of error management in accounting firms. The model suggests that error management—under ideal conditions—is a result of a self-reinforcing system in which organizational structures (e.g., quality and risk management system), team prevention procedures (e.g., workpaper reviews), team resilient practices (i.e., shared practices to quickly handle occurring errors), and individual characteristics (error anticipation and error coping) interact and jointly constitute and reconstitute each other. However, the multi-level model also outlines ruptures that explain why and how error management may fail, which suggests that error management in accounting firms is a fragile endeavor.

The multi-level model of error management contributes to the literature in several ways. First, it explains the emergence and execution of error management in accounting firms. This is novel because the audit error management literature has focused on relatively specific issues, namely, the error management climate and error reporting (Gold et al., 2014; Gronewold & Donle, 2011; Gronewold et al., 2013). Building on and extending this research, we capture error management as a broader construct and suggest a multi-level approach to understanding both how it emerges and how it is performed in accounting firms. Accordingly, audit team activities reside in nested arrangements and are affected by the bottom-up forces of the auditor's cognitions and emotions related to errors (i.e., error orientation) and by the top-down forces of social structures and systems. This multi-level research approach differs from typical behavioral and social studies in accounting, which usually either apply a behavioral or a structural lens alone or look selectively at unidirectional effects at a single point in time (e.g., how specific organizational factors influence individual judgments). A multi-level manner of theorizing enhances our understanding by moving the literature toward a more integrative and dynamic explanation of how audit quality is produced in practice.

Second, whereas previous behavioral and social research related to audit quality provided many insights into the functioning of quality control structures, of standard procedures such as workpaper reviews (e.g., Ramsay, 1994), of auditors' JDM (e.g., overview in Bonner, 2008), or more recently of an error management climate (e.g., Gold et al., 2014), this study contributes to the behavioral and social audit quality literature by addressing how these elements interact in preventing and handling errors in accounting firms. Outlining these interactions within the multi-level model suggests that aspects that have previously been treated in isolation are much more interrelated than the literature indicates. For instance, we describe and explain how preventive procedures such as workpaper reviews have a socializing effect on junior auditors' error orientation, which is crucial for the emergence of error resilient practices within audit teams. We therefore suggest that workpaper reviews have not only a direct effect on audit quality by correcting errors but also an indirect effect by socializing auditors with errors. Based on these findings, we suggest that considering the indirect socialization effects of standard procedures (see also Westermann, Bedard, & Earley, 2015) is more important than currently understood in the literature related to audit quality.

Third, the multi-level model may also inform the broader base literature on error management (Goodman et al., 2011). Although some studies have strived to understand the co-occurrence of error prevention and error resilience approaches within organizations (Vogus & Sutcliffe, 2007a, 2007b), those studies remain vague regarding 'the mechanisms through which these two approaches combine' (Goodman et al., 2011: 165). In this regard, the multi-level model of error management describes and explains one central mechanism by showing how preventive procedures (e.g., workpaper reviews) in accounting firms play a socializing role in individual auditors' dispositions regarding errors (i.e., error orientation), which is crucial for resilient practices to emerge within audit teams. Therefore, we outline how and why these prevention and resilient approaches to error management interact with and even entail each other within accounting firms.

2. Theoretical background

The production of audit quality has been subject to extensive research, despite ongoing discussion about its definition (e.g., Francis, 2011; McNair, 1991; Power, 1997, 2003). One key problem lies in the inherent 'obscurity' of the audit product and the assurance actually provided (Power, 1997). Because this assurance is neither observable nor exactly measurable, audits and the assurance provided are 'credence goods' that ultimately must be trusted by stakeholders (Causholli & Knechel, 2012; Power, 1997). However, while this obscurity inhibits exact measurement, it has not precluded scholars from defining audit quality conceptually. The majority of studies follow DeAngelo's (1981b) definition—as we do in this study—in which audit quality is the joint probability that a given auditor (a) finds breaches in the financial

[1] By the term 'base literature on error management,' we refer to the literature on error management outside of accounting and auditing that predominantly resides in the organizational behavior and psychology areas.

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statements and (b) reports these breaches. The former aspect is associated with auditors' competence and the latter with auditors' independence. To empirically understand differences in the provision of audit quality, two broad empirical research streams can be differentiated: (1) archival approaches and (2) behavioral and social approaches.

2.1. Archival research on audit quality

Archival research uses existing data, usually from repositories, i.e., data that are not originally produced for the research question at hand, and applies econometric methods of analysis to it (DeFond & Zhang, 2014). Findings of this research indicate that the legal and the regulatory environment affect the outcoming audit quality. For example, Francis and Wang (2008) provide evidence that audit quality is higher in countries with stronger investor protection regimes. Likewise, Maijoor and Vanstraelen (2006) find that audited financial statements were less affected by earnings management in countries with stronger audit enforcement regimes. Similar findings have been obtained in studies on regime switches (DeFond, Wong, & Li, 1999; Venkataraman, Weber, & Willenborg, 2008).[2]

Findings also indicate that contextual conditions regarding the audit client, the auditor, and the auditor-client relationship matter for resulting audit quality. Regarding the audit client, studies indicate an association between the presence of an audit committee and audit quality primarily because of the theorized protective and coordinating function that the audit committee might serve (e.g., Carcello & Neal, 2003; DeFond & Jiambalvo, 1991; Vafeas, 2005). With respect to the auditor, archival research findings suggest that accounting firm size is positively related to audit quality because of big firms' economic incentives, differences in production technology, and greater social capital (Francis & Yu, 2009; Lai, 2009). Finally, with respect to the auditor-client relationship, studies on auditor tenure suggest that audit quality may be higher when tenure is longer, which might be attributable to the increasing competence of the incumbent auditor. However, increasing tenure may also be negatively related to the auditor's independence (e.g., Chen, Lin, & Lin, 2008; Myers, Myers, & Omer, 2003). Non-audit services are often suggested to be associated with lower audit quality, but this relationship seems to depend on factors such as auditor tenure or industry specialization (e.g., DeFond, Raghunandan, & Subramanyam, 2002; Kinney, Palmrose, & Scholz, 2004). Finally, auditor specialization in the client's industry is mostly found to be associated with higher audit quality (Dunn & Mayhew, 2004; Solomon, Shields, & Whittington, 1999).

Thus, although the archival research stream shows that (and which) contextual conditions affect audit quality, this stream also faces substantial limitations. First, it is vague regarding the mediating mechanisms between an audit's contextual conditions and the resulting audit quality (DeFond & Zhang, 2014; Francis, 2004), which Francis observes as follows: 'To date, research on this topic has … not go[ne] inside the "black box" of the accounting firm's organizational structure and operations' (Francis, 2011: 138). Second, archival research seems to be overly concentrated on the auditor independence component of audit quality. Indeed, much archival research on the legal environment, auditor tenure, the provision of non-audit services, and accounting firm size theorizes auditor independence as the mediating mechanism of contextual conditions and the resulting audit quality. In contrast, auditor competence is less the focus of archival audit quality research, despite its indicated relevance in, e.g., studies on industry specialization (e.g., Dunn & Mayhew, 2004; Solomon et al., 1999). However, even the literature on industry specialization remains vague about the mediating mechanisms of how industry specialization translates into competence, i.e., what underlies its association with audit quality in practice (DeFond & Zhang, 2014).

2.2. Behavioral and social research on audit quality

The behavioral and social research approach has the advantage of being able to look inside accounting firms' 'black box.' Behavioral research related to audit quality usually applies cognitive and social psychology to the auditing context. This research aims to ground audit theory on detailed assumptions about cognitions, emotions, and social interactions in the institutional audit environment, applying a variety of methods such as experiments, surveys, interviews, and field studies for developing and testing these assumptions empirically.

Behavioral research has shown how organizational structures and systems influence auditors' daily work (e.g., Malone & Roberts, 1996; Pierce & Sweeney, 2006). For example, studies on quality control structures indicate that auditors' perceptions of the strength of these structures and procedures influences them to engage in reduced audit quality behaviors (RAQs) such as prematurely signing off audit steps or accepting insufficient client explanations (e.g., Malone & Roberts, 1996). The same research reveals the detrimental effects of tight time budgets, deadlines, and performance evaluations by showing how organizational structures and systems may lead auditors into RAQs (e.g., Pierce & Sweeney, 2006).

More directly related to the quality control of audit operations within the audit teams, studies on the role of workpaper reviews particularly inform our study. These studies provide rich insights into the relative effectiveness of the workpaper review procedure depending on contextual factors such as error type (e.g., Ramsay, 1994), reviewer experience (e.g., Ramsay, 1994), review format (Brazel, Agoglia, & Hatfield, 2004), the comprehensiveness of the review approach (Bamber & Ramsay, 1997, 2000), and workpaper 'stylization' (e.g., Rich, Solomon, & Trotman, 1997). Whereas this literature suggests that the review procedure can prevent a considerable portion of errors from remaining in the final workpapers, this same research also indicates the limitations of this formal procedure, as error detection rates appear unlikely to exceed 50 percent in realistic settings (as indicated by, e.g., Owhoso, Messier, & Lynch, 2002).

In contrast to these formalized organizational structures and procedures is emerging behavioral literature on the error management climate (e.g., Gold et al., 2014) and the wider JDM literature (e.g., Bonner, 2008), which focus on less formal practices and individual decision making. The emerging literature on the error management climate in accounting firms indicates that considering informal practices with respect to errors is another crucial component of understanding the production of audit quality (Gold et al., 2014; Gronewold et al., 2013; Stefaniak & Robertson, 2010). The main argument in this stream is that informal self- and peer-detection of errors and auditors' predisposition to report them within the firm are additional means of supporting audit quality. The wider JDM literature provides important insights regarding these individual predispositions as well, by demonstrating the importance of auditors' individual knowledge, skills, emotions, cognitions, and related psychological dispositions and processes—often also depending on situational conditions—for the quality of auditors' decisions (see Bonner, 2008, and Nelson & Tan,

[2] These findings are also supported by analytical models on the effect of legal regimes on audit quality (DeJong, 1985; Schwartz, 1997).

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2005, for summaries).

Social research related to audit quality is mostly inspired by sociological theories, action theory, and critical theory (Covaleski, Dirsmith, & Samuel, 1996; Hopwood & Miller, 1994; Power, 1997). It aims to understand the social origins of specific practices, i.e., it focuses on accounting and auditing as a 'social and institutional practice' (Miller, 1994: 1; see also Cooper & Robson, 2006). Social research regards auditors as embedded agents in the institutional heritage of the accounting field and the institutional practices of the accounting firm. Hence, auditors' cognitions, emotions, and judgments as social agents are subject to the structural influences of signification, power, and social norms. For instance, an ethnographic field study in a Big 6 firm by Covaleski et al. illustrates how management by objectives and mentoring become disciplinary technologies (Foucault, 1979), transforming 'professionals into … organizational members whose work goals, language, and lifestyle come to reflect the imperatives of the organization' (Covaleski, Dirsmith, Heian, & Samuel, 1998: 293; see also Dirsmith et al., 1997). From a different angle, Barrett et al. (2005) study how accounting practices in a globalized accounting firm are produced and reproduced in daily managerial practice. Examining the coordination mechanism of multinational audits, the authors show how global organizational structures and the local implementation of procedures interact in a dialectical manner. The authors particularly illustrate a tension between abstract global structures and systems, facilitating the standardization and local appropriation of these structures and systems that 'can both facilitate and undermine their use' (Barrett et al., 2005: 7).[3]

Overall, behavioral and social research offers critical insights for understanding the production of audit quality within accounting firms and shows that this production involves direct and interactive effects across different levels of analysis. This is indicated by behavioral studies on organizational structures and systems and related RAQs (Malone & Roberts, 1996), studies on error management climate (Gronewold & Donle, 2011), and the wider research on auditors' JDM quality (Bonner, 2008), along with social research that suggests that the social interaction within accounting firms may be adequately captured by considering an interplay of structures with agency (i.e., the actions and discourse of human agents within the organization) (e.g., Barrett et al., 2005; Dirsmith et al., 1997). However, despite these recurring indications of interactive effects among various levels of analysis (organization, team, and individual) and between structures and agency, the audit quality literature continues to take a rather static perspective on how these levels interact and mostly looks selectively at the unidirectional effects of mostly upper levels on lower levels of analysis (e.g., how specific organizational factors influence individual judgments).

2.3. An error management perspective on audit quality

To understand this dynamic multi-level interaction in the production of audit quality in accounting firms, we take an error management perspective. Error management is concerned with the joint effort made within an organization to (1) prevent and (2) handle errors (Goodman et al., 2011). Relevant concepts of error management have been outlined in diverse streams of literature outside the field of accounting, such as the literature on high reliability organizations (e.g., Weick & Sutcliffe, 2001), error management culture (e.g., Frese & Keith, 2015), normal accidents (Perrow, 1984, 1994), safety at work (Morgeson, Nahrgang, & Hofmann, 2011), and psychological safety (Edmondson, 1999). Despite their different approaches, views, and definitional nuances, scholars from these diverse fields all agree that errors and their management are key to understanding the quality of work outcomes.

The literatures mentioned above suggest several reasons that error management may also be critical for the quality of work outcomes in the audit environment. First, errors are in direct conflict with audit quality because they may lead auditors to false conclusions. Thus, preventing and addressing errors before they accumulate is essential (Cannon & Edmondson, 2005). Second, errors may stimulate learning within organizations because they provide clear signals that something is wrong and must be changed (Edmondson, 1999; Sitkin, 1992). Thus, the manner in which occurring errors are handled becomes essential for learning within accounting firms, which is important in the efforts to continuously improve the services provided. Third, research suggests that errors occur more often in environments with high workloads, intense time pressure, quick changes between tasks, the need to learn new things, complex technology, varying customers, and high coordination demands (Keith & Frese, 2010). All these characteristics are very typical in the audit environment, which suggests that preventing and handling occurring errors plays an important role in auditors' everyday work.

Recent audit literature that has brought error management theory from a behavioral approach to auditing supports this view by showing that the manner in which audit errors are approached in an accounting firm affects audit quality (e.g., Gold et al., 2014). In particular, experiments have shown that different error management climates in an accounting firm affect auditors' willingness to internally report self-discovered errors in situations in which error reporting is indispensable for error correction and, hence, that this willingness directly affects audit quality (Gold et al., 2014; Gronewold et al., 2013; Stefaniak & Robertson, 2010). Moreover, a survey study by Gronewold and Donle (2011) suggests that auditors' individual predispositions to address their own errors are influenced by how they perceive their audit organization's error management climate. This suggests that individual predispositions may mediate organizational-level influences on actual error management practices.[4]

In our study, we are particularly concerned with the management of action errors. We define action errors (hereafter referred to as 'errors') as 'unintended deviations from plans, goals, or adequate feedback processing, as well as incorrect actions resulting from lack of knowledge' (Frese & Keith, 2015: 622). Transferred to the audit context, this definition includes both 'mechanical' (e.g., calculation errors or technical application errors of standard audit procedures) and 'conceptual' audit errors

[3] In addition to studies on the institutional and structural origin of audit work, the social research program has problematized the more technical understanding of audit quality as it appears in archival research and addresses the social processes of 'making things auditable' (Power, 1996). Furthermore, e.g., Malsch and Gendron (2013: 870) examine the consolidation of commercial values in the auditing profession and show how 'the logic of commercialism is strengthened in accounting firms' structures and practitioners' mindset'.

[4] The audit literature on error management theory is still emerging and has been focused on the mentioned aspects of error management climate and error reporting. This literature has primarily investigated the effects of experimentally given climates (i.e., 'open' vs. 'blame' climates) on auditors' internal error reporting decisions, but leaves open many questions about how such climates emerge and what other kinds of error management practices may exist or evolve in audit firms. Therefore, error management as a broad concept, including both how it emerges and how it is executed, is not yet fully established within the audit literature. The base literature on error management outside the field of accounting therefore remains important for further informing theoretical development on error management in accounting firms.

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(e.g., setting wrong goals, making improper plans, lacking the knowledge to perform an audit procedure, or unwarranted judgment) (e.g., Ramsay, 1994). However, it is important to note that errors differ from violations (e.g., fraud). Violations are *intentional* actions to break a rule or refuse to conform to standards (Frese & Keith, 2015). In contrast, errors are both *unintentional* and potentially avoidable (Frese & Keith, 2015). Thus, violations such as fraud and other forms of misconduct (e.g., Cooper, Dacin, & Palmer, 2013; Palmer, 2013; Vaughan, 1999) are not within the scope of our study.[5] Furthermore, errors must be distinguished from their consequences (Frese & Keith, 2015). Although errors are mostly associated with negative consequences such as stress, quality deficits, and failure, they may also have positive consequences such as learning, resilience, and the motivation to adapt (Frese & Keith, 2015; Sitkin, 1992).

In attempting to understand how to manage errors, the base literature on error management has evolved into two opposing camps: error prevention and error resilience (Goodman et al., 2011; Wildavsky, 1991). Scholars adopting an error prevention approach argue that quality is best achieved by preventing errors and their accumulation through formal organizational structures and procedures. Organizational structures are understood in this literature as *formal* policies and processes at the organization level, such as standard operating procedures, internal control policies, and training programs (Goodman et al., 2011). Prevention procedures are *formal* rule-directed activities of front-end employees taken to prevent errors and their accumulation in daily work activity, e.g., through double checks and reviews. The underlying assumption of this prevention logic is that organizations can identify and define most or even all potential errors and prevent the occurrence of these errors through adequate *formal* structures and procedures (Goodman et al., 2011; Hofmann & Frese, 2011a). After an adverse event has occurred, such structures and procedures are adjusted to prevent similar events in the future (Goodman et al., 2011). Overall, the error prevention approach suggests that quality is the outcome of a lack of variance in predefined formal organizational structures, processes, and procedures (Goodman et al., 2011; Hofmann & Frese, 2011a).

In contrast, scholars adopting an error resilience approach argue that quality is best achieved by *informally* and flexibly reacting to errors (Reason, 1990; van Dyck, Frese, Baer, & Sonnentag, 2005). Error resilience is 'the ability to maintain positive adjustment or to bounce back' (Goodman et al., 2011: 162), i.e., to recover from adverse events such as errors. The error resilience camp suggests that individuals, teams, and organizations must be able to quickly and informally cope with errors (Goodman et al., 2011). The underlying assumption is that human errors are ubiquitous and that not every error can be prevented (Frese & Keith, 2015; Reason, 1990; Weick, 2012). As a result, organizations should promote individual resilience (Goodman et al., 2011) and shared practices to handle occurring errors (Edmondson, 1999; van Dyck et al., 2005). Accordingly, the error resilience approach opposes the error prevention approach by suggesting that 'unvarying procedures can't handle what they didn't anticipate' (Weick et al., 1999: 86). Thus, the idea that predefined formal structures and procedures 'are the source of reliability conflates variation and stability and makes it more difficult to understand the mechanisms of reliable performance under trying conditions' (Weick et al., 1999: 86–87). As a result, there is a great divide between scholars adopting an error prevention approach and those adopting an error resilience approach.

Despite these contradictions, the opposing camps agree that a main challenge of effective error management lies at the individual level. Research suggests that effective error management may be severely impeded by three human characteristics. First, humans tend to attempt to avoid feeling embarrassed, vulnerable, or incompetent (Argyris, 1976). Therefore, they are reluctant to engage in procedures that may uncover their own errors and to communicate occurring errors openly to others (Zhao & Olivera, 2006), which might inhibit both the prevention of an accumulation of errors and the rapid handling of errors. Second, humans have difficulty identifying errors correctly within complex cause-and-effect chains (Dörner & Schaub, 1994), which may impede effective engagement in prevention procedures and handling occurring errors adequately. Third, humans prefer to analyze successes instead of errors (Sitkin, 1992), which may limit learning from errors in organizations.

However, both the prevention camp and the resilience camp provide rich insights into error management across quite different levels of analysis. The prevention camp has noted the relevance of formal organizational structures and procedures that are governed by an explicit blueprint or plan to prevent errors and their accumulation (e.g., organizational design rules or standard operating procedures) (Goodman et al., 2011). The error resilience camp has stressed the importance of individual coping skills and informal shared resilient practices that emerge in social interaction (e.g., psychological safety, error management culture, or processes of mindfulness) (Goodman et al., 2011). Both streams highlight the crucial role of the individual (i.e., in preventing errors or responding to them resiliently). Taken together, these insights from the broader error management literature outside the accounting field theoretically guide our empirical analysis of error management in accounting firms, to which we turn next.

3. Research methods

We engaged in an in-depth case study of one of the Big 4 accounting firms located in Germany. To protect the anonymity of the firm studied, we refer to it as 'The Firm.' The Firm has operations in more than 100 countries with more than 500 offices worldwide and is organized along multiple dimensions, such as geographic locations, lines of service, and industry-sector specializations. To gain insights into error management on multiple levels of analysis, the case study method appeared most appropriate (Eisenhardt, 1989; Yin, 2013). This method involves tracing individuals and teams in their natural organizational context to gain insights into complex interactions at multiple levels of analysis (Covaleski & Dirsmith, 1990; Power & Gendron, 2015; Radcliffe, 2010). Following a naturalistic inquiry, according to which researchers should be familiar with the culture of the organizations they study (e.g., Denzin, 1971; Hammersley & Atkinson, 1983), one of the authors worked at The Firm during the busy seasons over a period of three years. This gave us, as a research team, unique access to context-rich data for exploring error management in a Big 4 accounting firm.

3.1. Data collection

3.1.1. Participant observation

A primary method of data collection was participant observation, which involved actively working within audit teams. During our study, one of the authors actively worked in 14 audit teams as

[5] We acknowledge, however, that there is a fuzzy boundary and therefore some overlap between the two concepts because fraud may, e.g., evolve from initially unintentional misconduct and either 'normalize' over time or occur 'accidentally' (at least in the initial stages), e.g., because of the concurrence of complex organizational conditions (Cooper et al., 2013; Perrow, 2010; Vaughan, 1999).

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an embedded investigator.[6] The total time spent in the audit teams was approximately 18 months over a period of three years. Working within these teams included working at the offices of various clients, which gave us a natural opportunity to constantly contrast error management across different teams operating under different client and work settings. The number of members of the core audit engagement teams varied from three to twelve. Insights from our participant observation were documented in field notes and prompted further questions during interviews and subsequent observations. This technique allowed us to gain an intimate familiarity with the functioning of audit teams in The Firm in real time. Moreover, working alongside auditors helped us to build trust with our informants (Yin, 2013). This mutual trust, along with the intimate familiarity with The Firm's value system and language, proved essential for the open discussion of errors and error management with the auditors.

3.1.2. Interviews

A second data collection method was semi-structured interviews. Using theoretical sampling (Glaser & Strauss, 1967), we applied different criteria for collecting data in order to find variations that could explain emerging patterns of error management. We selected interviewees along various dimensions, such as the ranks of the interviewees, teams, offices, nationalities, and service lines. We chose to interview auditors of different ranks (junior, senior, manager, partner) in order to develop a comprehensive understanding of error management within The Firm from different perspectives. Different teams were chosen to isolate team particularities. We interviewed auditors from a variety of offices within Germany because previous studies have reported varying levels of audit quality in different offices within the same national entity (Choi, Kim, Kim, & Zang, 2010; Francis & Yu, 2009). We also interviewed auditors from The Firm's offices in other countries to consider national idiosyncrasies. These auditors came from countries as diverse as the UK, Singapore, Ireland, Austria, Switzerland, Italy, the Netherlands, the Czech Republic, and India. In total, we conducted semi-structured interviews with 30 auditors across all levels of seniority from 12 offices in 10 countries. Additionally, we interviewed seven management consultants from The Firm, which allowed us to compare the responses of auditors with those from another group of knowledge workers (Alvesson, 2001). This comparison helped to sharpen the specifics of error management in auditing. Moreover, we interviewed the national head of quality and risk management. Table 1 summarizes the descriptive characteristics of the interviewees.

We began all interviews with a broad question regarding instances of errors that participants could recall. This technique proved helpful in allowing the emergence of new themes before limiting informants' responses with specific questions. For the first interviews, after participants' free reports of an error that had occurred during an audit, more specific questions regarding different topic areas and aspects of error management were asked, again soliciting free responses related to personal experiences. A structured listing of thematic complexes and items from questionnaires previously used to study high reliability organizations (Weick & Sutcliffe, 2001), error management culture (van Dyck et al., 2005), and individual error orientation (Rybowiak, Garst, Frese, & Batinic, 1999) served to orient the interviews. We note, however, that the questionnaire items on the listing were never directly asked. Rather, the interviewer was careful in formulating questions in a way that simply introduced the respective theme or aspect of error management in order to ensure that we did not miss any facets of error management known from prior research. This approach was also used to avoid priming participants any more than necessary to make them consider the respective notion in their experiences. After the first ten to fifteen interviews, we reached a point of theoretical saturation for most of the themes indicated by the listing. Thus, we began to further explore emerging themes that had developed during participant observations and prior interviews (Glaser & Strauss, 1967). All interviews were tape-recorded (with the participants' consent) and fully transcribed to facilitate the data analysis.

3.1.3. Archival materials

In addition to conducting participant observations and interviews, we analyzed relevant archival materials concerning The Firm's organizational structure and procedures. The analyzed documents primarily stemmed from The Firm's global internal database. These documents included a description of the quality and risk management system, charts depicting the organizational structure, practice manuals, codes of conduct, training materials, and learning, development, and staffing plans. These archival materials provided a more differentiated picture of the blueprints for the organizational structures and procedures to guide auditors' activities (Yin, 2013). According to our comparative approach, this information was also useful in uncovering new themes. Collectively, we used the field observations, interviews, and document inspections to mutually triangulate the findings from the different data sources (Yin, 2013).

3.2. Analytical approach

Our analysis followed an abductive approach that builds on the interaction among data, existing theoretical frameworks in the literature, and the emerging theoretical themes (Alvesson & Kärreman, 2011; Alvesson & Sköldberg, 2009; Mantere & Ketokivi, 2013; Orton, 1997). We used an iterative process of collecting, coding, and categorizing 'empirical material as a resource for developing theoretical ideas' (Alvesson & Kärreman, 2011: 12). This entailed a process of subsequent abstraction from raw data by coding, categorizing, and linking categories to emerging themes and reflecting them using existing frameworks in building new theory (Gioia, Corley, & Hamilton, 2013). Although our empirical inquiry created inductive hunches from our fieldwork, we tried to make sense of these insights by applying multiple theories such as error climate or error orientation as thought tools, not to fit data to the theory, but rather to explore the data using diverse theoretical framings to determine which one fits best. As suggested by Langley (1999), coding and analysis will not produce theory without an uncodifiable creative leap (see also Suddaby, 2006). Consequently, this abductive

[6] The author was employed part-time by The Firm. The teams he worked in were informed about the double role as an embedded investigator. We do not have any indications that this influenced how the auditors within the teams behaved beyond a very brief initial habituation phase. We found that the auditors worked under fierce time pressure, which made it nearly impossible to maintain 'non-natural behavior' over an extended period. The embedded investigator usually observed the auditors for several weeks within the audit teams, and we found that after a very brief habituation phase, the auditors did not pay any further attention to being observed. Therefore, over several weeks, a quite robust and substantiated understanding of how auditors managed errors resulted. The investigator was paid for the audit work because he was employed by The Firm, but the research project did not receive any financial support by The Firm. Indeed, the investigator worked part-time to combine his interest in doing research and working as an auditor. Shortly after the field research work finished, the embedded investigator rejoined academia full-time. His current position is fully independent from The Firm. The Firm did not impose any restrictions on what could or could not be written and published provided that The Firm's identity and client identities were not revealed.

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Table 1
Characteristics of interviewees.

Service Line	Rank	Nationality	Years of Experience	Area of Specialization
Audit	Partner 1	Germany	20+	Financial Statements Audit
	Partner 2	Germany	15+	Financial Statements Audit
	Partner 3	Germany	25+	Financial Statements Audit
	Partner 4	Germany	25+	Financial Statements Audit
	Senior Manager 1	Ireland	8+	Financial Statements Audit
	Senior Manager 2	Germany	8+	Financial Statements Audit
	Senior Manager 3	Germany	8+	Financial Statements Audit
	Manager 1	Spain	7–8	Financial Statements Audit
	Manager 2	India	7–8	Financial Statements Audit
	Manager 3	Malaysia	7–8	Financial Statements Audit
	Manager 4	Germany	6	Financial Statements Audit
	Manager 5	Germany	8+	Financial Statements Audit
	Senior 1	Singapore	3+	Financial Statements Audit
	Senior 2	Singapore	3+	Financial Statements Audit
	Senior 3	Germany	4	Financial Statements Audit
	Senior 4	Germany	4	Financial Statements Audit
	Senior 5	Germany	5	Financial Statements Audit
	Senior 6	Germany	4	Financial Statements Audit
	Senior 7	Germany	5+	Financial Statements Audit
	Senior 8	Germany	5	Financial Statements Audit
	Senior 9	Germany	3+	Financial Statements Audit
	Junior 1	The Netherlands	2	Financial Statements Audit
	Junior 2	Czech Republic	2	Financial Statements Audit
	Junior 3	UK	2	Financial Statements Audit
	Junior 4	Malaysia	1	Financial Statements Audit
	Junior 5	Singapore	3	Financial Statements Audit
	Junior 6	Germany	3	Financial Statements Audit
	Junior 7	Germany	2	Financial Statements Audit
	Junior 8	Germany	1	Financial Statements Audit
	Junior 9	Germany	1	Financial Statements Audit
Consulting	Partner 1	Germany	20+	IT Process Consulting
	Senior Manager 1	Germany	8+	IT Process Consulting
	Senior 1	Germany	5	IT Process Consulting
	Junior 1	Austria	3	IT Process Consulting
	Junior 2	Austria	1	IT Process Consulting
	Junior 3	Germany	1	IT Process Consulting
	Junior 4	Germany	1	IT Process Consulting
HR	Manager 1	Germany	5+	Training and Development

theory development followed numerous data-theory iterations and feedback loops (Lincoln & Guba, 1985; Strauss & Corbin, 1998). The coding and comparison process of the transcribed material was supported by the computer-based program ATLAS.ti 7.0 for qualitative data analysis.

Throughout the data analysis, we used triangulation to ensure the trustworthiness and credibility of our study (Jonsen & Jehn, 2009; Malsch & Salterio, 2016). Specifically, we maintained a practice of rigorously questioning the interpretations throughout the analysis to ensure that the emerging categories were grounded in the data. Whenever conflicts in coding and categorization arose, we discussed these instances and returned to the data to substantiate the claims with documentary evidence. Whereas one member of our research team was an embedded investigator with contextualized knowledge of The Firm's structures, procedures, and practices, the other two team members played a 'devil's advocate' role by representing an outside perspective (Miles & Huberman, 1994). This practice of peer debriefing was extended to colleagues within our departments and to other researchers who gave feedback at different stages of the study. Furthermore, after writing up our case study and the resulting theoretical framework, we provided the findings to several auditors from The Firm (one partner, one manager, and two seniors) for member checking and to receive feedback.[7] We integrated their suggestions in order to further strengthen our case study and the theoretical model.

3.3. Data analysis process: abstracting from the empirical material

In compliance with professional standards (e.g., International Auditing and Assurance Standards Board [IAASB] 2016, International Standard on Quality Control [ISQC 1]), accounting firms devote substantial effort to quality control, with key mechanisms being a standardized audit methodology, rigorous documentation requirements, and the hierarchical workpaper review process. These mechanisms are classic error prevention structures and procedures that aim at ensuring that the audit work underlying the issued opinion is free from (material) audit errors. Although accounting firms' strong focus on error prevention was therefore well-known in the audit literature when we started our field

[7] Member checking and engagement of experienced practitioners is recommended, e.g., in objective hermeneutics (e.g., Oevermann, Allert, Konau, & Krambeck, 1979; Soeffner, 2004) and by Strauss (1987) within grounded theory. It is also closely linked to a practice of 'peer de-briefing' (Lincoln & Guba, 1985), in which a project is discussed with colleagues who have not worked on the same project. The underlying idea of this procedure is to check whether the research findings are inter-subjectively comprehensible and reflect a shared set of experiences within The Firm. Some of the auditors we asked for feedback had only partially been exposed to the same data; however, they were part of the same community of practice, and their assessment helped us to determine the extent to which our findings were idiosyncratic or reflect broader patterns that these auditors have also experienced at The Firm.

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research (albeit without using this error management terminology), the role of error resilience was largely unknown.[8]

It therefore grabbed our attention early in the data analysis process that we did observe distinct resilient practices within audit teams. This apparent co-existence of strong error prevention structures and procedures on the one hand and regularly exercised error resilient practices in the auditors' daily operations on the other hand cannot be explained by the current state of the error management literature either inside or outside the auditing field.[9] Therefore, the audit environment apparently allowed an exploration of the conditions and relationships that may explain why and how the two approaches could co-exist.

To understand these conditions and relationships in more detail, we began an iterative process of moving back and forth between the empirical data and theoretical frameworks to gain a systematic understanding of their co-existence. This process of abstraction and systematization aims at identifying dominant patterns and explaining how they are related (Strauss & Corbin, 1998; Maxwell, 2013). However, to develop a more fine-grained and balanced account from our empirical data, we also searched for 'alternative voices' or perspectives that were less dominant, along with ruptures within the dominant patterns and their relationships (Alvesson & Sköldberg, 2009).

Although in practice, the analysis process was more iterative than linear, the data analysis process and its major intermediate results can be described in the following five main phases.[10] This description allows the reader to retrace the iterative data analysis process. In the first phase, we analyzed the informal within-team practices that enabled the audit teams to anticipate and quickly address occurring errors. This phase of analysis suggested four distinct *resilient practices (RP)*.[11] For example, we noticed that auditors showed and described 'a constant struggle to know what is happening within the team,' and they asserted that 'communication is essential to catch errors early on.' We abstracted such empirical cues into the more abstract resilient team practice of *realizing what is going on (rp1)*.[12] Furthermore, our interviews were scattered with reiterations of 'you simply have to stay calm when errors occur' or 'you have to save the situation first.' We grouped this description of the struggle of acting calmly when facing an error into the second-order category of *cool-headed error handling (rp2)*. Moreover, the auditors engaged in activities to triangulate their own findings or claims of team members and clients with further evidence. We abstracted these activities to the more general resilient practice of *triangulation in practice (rp3)*. A fourth pattern that emerged through descriptions of how error handling is 'pushed around within the team' or that 'everything can be handled because there is somebody at The Firm who will know about it' was abstracted to the resilient practice of *informed decision making (rp4)*.

In the second phase, we used these four *resilient practices (RP)* as a starting point to understand what enabled these *resilient practices (RP)* to emerge within teams. Revisiting the initial codes suggested that the individual orientation toward errors was crucial. Using expressions such as 'you get an awareness that errors happen all the time,' 'we have to accept that errors happen in our work,' and 'there will always be wrong decisions,' the auditors described an anticipation of errors that appeared quite unusual in the German work context.[13] Reflecting on these cues with the literature (Rybowiak et al., 1999), we abstracted this notion to the concept of *error anticipation (eo1)*. Furthermore, the auditors frequently referred to an experienced 'emotional blunting over time,' along with the concept of 'Tiefenentspanntheit,' the outward appearance, mostly of more senior auditors, of keeping calm in the event of an error. We interpreted these cues as part of the more abstract concept of increasing *error coping (eo2)* skills of the more senior auditors. Notably, *error anticipation (eo1)* and *error coping (eo2)* seemed to be shared by most of the more senior auditors we interviewed across countries as diverse as Germany, the Czech Republic, France, the UK, Singapore, and India.

In the third phase, which was interrelated with the second phase, we attempted to understand what leads to the development of this *error anticipation (eo1)* and *error coping (eo2)* over time. Our hunch was that it occurs over time because junior auditors exhibited substantially less *error anticipation (eo1)* and *error coping (eo2)*. That said, was this a result of a (self-) selection process, of continuous socialization, or both? Because the theme of individual development with regard to errors frequently arose within our interviews, we asked the interviewees about their thoughts on it. The answers suggested that this development was largely the consequence of being constantly confronted with small-scale errors at work. For example, the auditors mentioned that 'reviews constantly note the errors you make.' In addition, they explained that 'you are always changing teams, tasks, and clients, so there is no chance of not making mistakes.' Additionally, the auditors reported that 'through feedback, your strengths and weaknesses are noted to you.' Through further discussion with the auditors and further participant observation, we became more aware that certain formal procedures within the teams played an important role in socializing the auditors in this regard. These formal procedures mostly had a prevention function (albeit not necessarily an exclusive and straightforward one). The most prominent of these formal prevention procedures within the auditors' daily work that

[8] Recent experimental studies on the error management climate (e.g., Gold et al., 2014) have begun to consider firm-internal error reporting as an example of a resilient error management practice. Because these studies used experimentally created settings, it remains unclear whether or to what extent the conditions for error resilience to occur are given or not given in accounting firms and—if they are—how they arise. Gronewold and Donle (2011) report results below item-scale midpoints for auditors' predisposition to engage in resilient-type behaviors (significance was not tested), although the descriptive statistics are limited and refer to a mixed sample with external, internal, and public-sector auditors, i.e., quite different institutional audit environments. Moreover, audit studies that use error management theory all mention potential threats in the audit environment to practicing a 'high degree' of error management (as articulated by Gronewold & Donle, 2011) or to openly report errors (as studied by Gold et al., 2014), e.g., the fear of being sanctioned for having made an error in an environment in which errors should be avoided. Therefore, the regular exercise of resilient practices in an accounting firm could not be readily expected ex ante.

[9] This is because the audit-specific error management literature has not yet been developed in this regard, and opposing positions in the base literature on error management imply that typically *either* an error prevention *or* an error resilience approach is dominant in a given organization (Goodman et al., 2011; Wildavsky, 1991).

[10] In the following explanation of the five phases, we broadly refer to central empirical results (the emerging concepts and linkages) of our study to make the process of analysis traceable for the reader. Referring broadly to our results in this methods section is necessary because the process of analysis was dependent on the findings (i.e., major intermediate findings entailed subsequent steps in data analysis and/or collection). However, the detailed presentation of these findings together with the provision of supporting textual, observational, and documentary evidence will follow in the upcoming 'Case findings' section.

[11] To facilitate the referencing of the emerging concepts with the figures below that summarize the data analysis process (Fig. 1) and the resulting multi-level model of error management (Fig. 2), we indicate the abstracted **umbrella constructs** with capital-letter abbreviations, e.g., *(RP)* for *resilient practices*.

[12] To facilitate the referencing of the emerging concepts with the figures below that summarize the data analysis process (Fig. 1) and the resulting multi-level model of error management (Fig. 2), we indicate the **second-order concepts** with lower-case letters and an increasing number in case of several **second-order concepts**, e.g., *(rp1)* for the resilient practice of '*realizing what is going on*.'

[13] Comparing 62 countries, Germany is second to last with respect to error tolerance (Frese, 2005).

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affected the auditors' socializing with errors were frequent *workpaper reviews (pp1)*, *feedback* procedures *(pp2)*, and *job rotation (pp3)*.[14] Reflecting upon these insights and comparing them with our understanding of the formal *organizational structures (OS)* and systems, we realized that these procedures were associated with The Firm's *quality and risk management system (os1)*, its *learning and development system (os2)*, and its *multidimensional matrix organization (os3)*.

In the fourth phase, we further aggregated and abstracted our **second-order concepts** into **umbrella constructs**, which are associated with error management at The Firm. We grouped the constructs of *realizing what is going on (rp1)*, *cool-headed error handling (rp2)*, *triangulation in practice (rp3)*, and *informed decision making (rp4)* as being informal *resilient practices (RP)* within audit teams. Reflecting the notions of *error anticipation (eo1)* and *error coping (eo2)* at the individual level with the literature, we found that auditors developed what the error management base literature refers to as an individual's *error orientation (EO)* (Rybowiak et al., 1999). Furthermore, *workpaper reviews (pp1)*, *feedback (pp2)*, and *job rotation (pp3)* were grouped as formal *prevention procedures (PP)* within the teams.[15] Finally, we grouped the *quality and risk management system (os1)*, the *learning and development system (os2)*, and the *multidimensional matrix organization (os3)* as formal *organizational structures (OS)* of the organization. This abstraction process resulted in the data structure (Gioia et al., 2013; Patvardhan, Gioia, & Hamilton, 2015) that is summarized in Fig. 1.

In the final phase, we investigated the dynamic interaction between different levels of analysis (Gioia et al., 2013). This process involved the task of identifying coupling or linking relationships between the individual, team, and organizational levels. We therefore began discriminating linking relationships among these different levels of analysis and used our empirical material to facilitate grounding and reflection (see also Alvesson & Kärreman, 2011). Four linking relationships and associated ruptures within these relationships emerged from this analysis: *structure-team linking (L1)*[16]: *translating structures into procedures*; *team-individual-linking (L2): socializing individuals*; *individual-team-linking (L3): mobilizing reflection-in-action*; and *team-structure-linking (L4): updating structures*. These linking relationships helped us to finalize our theoretical model by coupling these different levels of analysis in an integrated multilevel model of error management. Based on the described analysis procedure, we will now turn to provide a detailed empirical account of the emerging patterns and relationships by means of a rich narrative within the 'Case findings' chapter.

[14] Hence, the effect of socializing auditors with errors—that these three *prevention procedures* had according to our findings—was decisive for including them in our model within the '*prevention procedures*' category. Other potential *prevention procedures* that were not signaled to have such an effect were not included.

[15] The category '*prevention procedures (PP)*' does not claim to be a complete set of all error prevention mechanisms that may be in place at The Firm. Instead, it comprises those formal team-level procedures with a (not necessarily exclusive or straightforward) prevention function that our data and analyses suggested as causative for auditors' development of an *error orientation (EO)* over time (mostly driven by the effect of these formal procedures to constantly confront the auditors with errors that they make in their work).

[16] We use the abbreviations *(L1)*, *(L2)*, *(L3)*, and *(L4)* as references for the proposed relationships between the **umbrella constructs** to facilitate cross-referencing throughout the paper. The letters tie in to Fig. 2 and to the respective subheadings within the 'Case findings' section titled 'Multi-level linking: self-reinforcing versus disruptive dynamics,' in which we provide a narrative of the relationships and associated ruptures.

4. Case findings

In this section, we present our findings in three main steps. First, we empirically describe errors in the audit environment to clarify the subject matter of our study. Second, we describe our empirical findings on the identified themes in our case study in the form of a 'thick narrative.' Thus, here we provide the detailed empirical material on the identified **first-order concepts**, along with their abstraction into the **second-order concepts** and their grouping into the **umbrella constructs**, as already briefly summarized in the 'Data analysis process: abstracting from the empirical material' section and Fig. 1. This narrative is organized by the **umbrella constructs** in the order in which they emerged in our empirical data collection and analysis process. The findings and their interconnections unveiled in this narrative entail an idealized model of error management within The Firm that we abstracted from our empirical data. This idealized model describes how informal *resilient practices (RP)* within audit teams crucially depend on individuals' *error orientation (EO)*, which gradually develops through experiences with formal *prevention procedures (PP)* within the audit teams that are constituted and reconstituted through *organizational structures (OS)*. As such, we describe error management within accounting firms under ideal conditions as a self-reinforcing system. Third, we identify ruptures within this system that explain why and when error management is likely to be ineffective or to fail. To indicate the origins of the data sources, we (i) label quotes as spoken by participants in the field by putting them in quotation marks; (ii) additionally label interview quotes as (Int.) to differentiate them from field quotes; and (iii) label data from archival materials as (Arc.).

4.1. Errors in auditing

During participant observation, we quickly became aware that errors were ubiquitous in audit teams. The errors we observed came in different degrees, yet many did not involve high levels of discretion, such as judgment errors on complex accounting issues. Rather, we observed a plethora of 'smaller' errors that, nevertheless, could have material consequences for the audit opinion. Typical errors included performing standard audit procedures without properly addressing the assertion in question, accepting inadequate explanations or other audit evidence obtained from the client, and making wrong calculations, among others. We found, in line with theoretical ideas on this matter, that the ubiquity of errors within audit teams arose mainly from the conditions that particularly the junior auditors were likely to experience in the teams. Junior auditors were assigned tasks in which they had little experience, struggled to learn the standard audit procedures, and worked under intense time pressure at an unfamiliar client, in a work context involving high coordination demands with the client, within the core team, with supporting IT and tax specialists, and with component teams around the world.

We observed that occurring errors—when discovered by the auditors themselves or brought up by other team members—were oftentimes referred to with statements such as 'damn, I should have known better' or 'sorry, I did not know this.' These typical reactions indicate that the auditors seemed to share a common understanding of what constitutes an error. We attributed this shared understanding to intensive 'on-the-job' and 'off-the-job' training and the socialization of the auditors within The Firm and the profession. This includes the application of professional and firm-internal audit methodology and quality control standards that prescribe how audit procedures should be performed—implying deviances from these prescriptions as errors. While we observed some negotiations in the review process about whether an error

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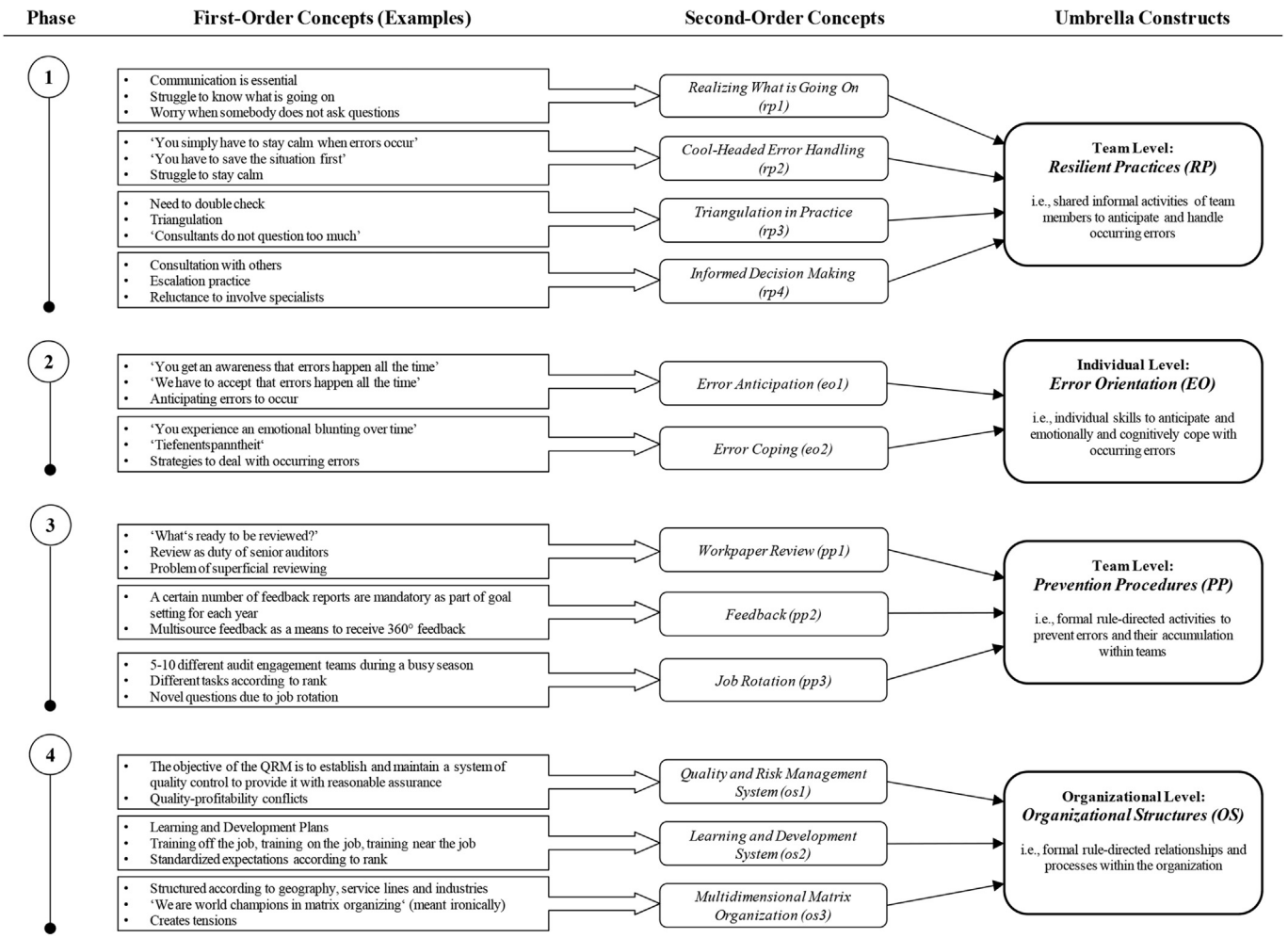

Fig. 1. Data structure.

made was 'material,' our findings suggest a high consensus among auditors on what constitutes an error.[17] In this vein, we found that when an error was recognized, auditors usually tried immediately to assess the error's 'materiality' as their initial criterion to determine how to further address it.[18]

What particularly grabbed our attention, however, was that the audit *teams* seemed to engage in distinct practices, which enabled them to quickly detect and handle occurring errors as a team. While these practices seemed to be shared by most audit teams—albeit to varying degrees—they were not formally prescribed. Rather, these practices were repeated activities that emerged in informal interactions among audit team members. We therefore moved on to explore these practices in audit teams that we have labeled *resilient practices (RP)*.

4.2. Team level: resilient practices (RP)

4.2.1. Realizing what is going on (rp1)

A shared informal practice within teams that became salient early on was the practice that we labeled realizing what is going on. This practice enabled the team to quickly detect occurring errors in order to address them. More senior auditors frequently referred to a felt need to have a constant awareness of 'what is going on within the team,' 'what are the issues,' 'where are the strengths and weaknesses of team members,' and whether 'junior team members actually understand what they are doing.' Interestingly, we even noted how seniors felt uneasy when they saw a lack of communication within the team, especially with the most junior auditors with little experience; something that they described as an 'awkward feeling when somebody does not ask a question for a while.' As a result, particularly more senior auditors frequently offered questions to check about the current state of the work of team members, such as 'how is it going with the A/R aging?' This practice also involved providing quick and informal feedback

[17] Note that we observed this high consensus mainly for smaller errors that were relatively easy to recognize as an error when being prompted to them (either by the auditors themselves via self-discovery or by other team members), i.e., errors with a relatively low degree of 'obscurity' (Power, 1997).

[18] Early assessment of a presumable error's materiality does not appear trivial, as it would, e.g., require a strict differentiation between the error and its consequences for the (correctness of the) audit opinion. The latter will be decisive for the error's materiality, but will oftentimes not be known and will be difficult to assess (e.g., the consequences for the audit opinion of not having collected sufficient evidence in an audit step will importantly depend on whether undetected financial statement errors remain as a result of this audit error, which is unknown to the auditor). Nevertheless, the auditors in our study stated that they routinely made such initial assessments and appeared quite confident in doing so, without showing noticeable awareness of the mentioned problems. Thus, while it was not within the scope of this study to enter more deeply into these problems, auditors' assessment of the materiality of an error's consequences appears to be a relevant and interesting question for future research. As described in the text, we took a different direction in this study by entering deeper into the emerging shared practices at the audit team level and their respective antecedents.

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within the teams to get more-junior auditors 'back on track' and to quickly catch 'when things went in the wrong direction.' This practice of realizing what is going on, however, was not limited to the on-site team. We found that teams often engaged in intensive communication with managers and partners who were at the office or at other clients, and our participant observation indicated how important this practice was for the quality delivered by the audit teams. In teams in which we had the impression that people hesitated to quickly communicate and share information, it seemed to be almost foreseeable that at some point, something would 'blow off.' This struggle to realize what is going on, as well as its perceived relevance, were put quite explicitly by one partner in an interview when he noted:

> 'Because all the things that can go wrong can be identified through quick communication, I think the worst that can happen when you are a Manager or a Senior, or whatever, is that others do not clearly communicate how far along they are, what they struggle with, and what they do and do not understand.' (Int.)

4.2.2. Cool-headed error handling (rp2)

We often observed that teams engaged in an informal practice that we labeled cool-headed error handling, in which they tried and struggled to remain calm when detecting an error. This does not mean that the audit teams always engaged in this cool-headed error handling practice, and it does not mean that the auditors were not emotionally affected by the errors, either. Nevertheless, the cool-headed error handling seemed to be a shared and common practice that served the purpose of 'saving the situation first,' as the auditors put it. This notion of 'saving the situation first' was also noted in several interviews. One auditor expressed this notion as follows:

> 'Yes, […] but it is the current situation [referring to an error that happened]. It is a problem, and now we just have to find a way to deal with it.' (Int.)

Another manager expressed the same idea as follows:

> 'This [error] happened and this has to be admitted frankly. But now let us see how we can rescue the situation. […] With "rescuing the situation," I do not mean to cover up, but to talk openly about it and find a solution. This means to see which consequences it [the error] has and whether it can be handled, so that it does not result in more severe consequences.' (Int.)

Our participant observation indicated that this cool-headed error handling practice was crucial for the outcome of audits because it helped to quickly handle the error instead of engaging in forms of blaming. However, when a junior auditor began to engage in blaming, we often saw senior auditors intervene. These interventions involved statements such as 'this can happen to anybody' and 'you know, we all make mistakes.' This practice was important for the teams because a 'good connection' between the team members and with the client without blaming was considered critical for 'getting the job done.' Again, this does not mean that there was no blaming at all. However, blaming was relatively uncommon during our participant observations, considering the omnipresence of errors that occurred during an audit.

4.2.3. Triangulation in practice (rp3)

Comparing The Firm's auditors to other knowledge workers (management consultants), auditors were considered to be very 'skeptical.' This was even considered a matter of pride among auditors, reflecting their tendency to critically triangulate claims or evidence with different sources of (other) evidence. It also entailed a tendency not to be afraid of asking further questions in case something seemed not to be 'plausible,' even when this involved a threat of appearing unknowledgeable or 'stupid.' In a similar vein, auditors frequently applied 'plausi checks' (colloquial term used by the auditors for 'plausibility checks'). These 'plausi checks' were also documented in workpapers as a way to triangulate, e.g., a calculation presented by the client or even the auditors themselves. We found that such triangulation (or cross-examination) practices also played a major role in junior auditors' 'on-the-job' training. During our participant observations, we recognized a recurring practice: junior auditors were assigned a problem-solving mission at the client site (e.g., understanding a specific accounting issue) and were repeatedly sent back to the client until they returned with a solution that demonstrated—in the view of the senior auditor—a 'proper,' well-grounded understanding of the issue at hand. We saw that junior auditors usually felt uncomfortable being sent back to the client. As a result, however, in similar future situations, this practice made them sit in front of the client and ask further questions until they felt that they had 'properly understood,' instead of choosing the easy way of quickly leaving the client, which might not have given the ability to withstand their senior auditors' cross-examination when they returned.

4.2.4. Informed decision making (rp4)

An important informal practice for resiliently dealing with knowledge gaps was the practice that we labeled informed decision making. This audit team practice involved rapid consultation with other members of The Firm in case a question could not be solved or evaluated by the team on site. A manager described this practice as follows. In a typical audit, there are two to three critical audit issues that cannot be finally evaluated by the team on site, mostly because they do not have the expertise to solve this audit (or underlying accounting) issue. These points, when identified by the junior auditors, are addressed to the manager. If the manager cannot solve the problem, it is quickly brought to the attention of the partner. If the question still cannot be properly addressed, it is transferred to specialists. These can be other partners, managers, or other experts, e.g., in the department of professional practice. While we found this escalation practice illustrative of how different levels were commonly involved in decision making, this is not to say that it always actually worked like this. There was, e.g., some reluctance to involve specialists and the department of professional practice right away, mainly as a result of time and cost considerations. Additionally, young auditors in particular sometimes felt anxious to admit that they did not possess the knowledge to make proper judgments on specific accounting issues. In other cases, these knowledge gaps led the auditors to postpone the task and work on other tasks because they felt the pressure to 'get their stuff done.' Oftentimes, when these practices hindered quick and informed decision making, problems were created toward the end of the audits. We believe this is the reason why this practice was widely considered critical for the success of an audit, which became particularly apparent when it was not practiced.

4.3. Individual level: error orientation (EO)

While *resilient practices (RP)* sometimes varied considerably, they were still remarkably present. Our findings suggest that they are crucial for addressing daily errors during an audit and thus, are an important aspect of the quality of the service delivered. We therefore began to explore what enabled the emergence of these

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shared informal practices, and our findings indicate that they crucially depended on the individuals' orientation toward errors. Although the auditors varied in their *error orientation (EO)*, we still found that more experienced auditors of The Firm had a distinct mindset with respect to errors. This distinct approach was evidenced in our interviews by an almost mantra-like repetition of phrases such as 'to err is human,' 'we make mistakes all the time,' 'I am sure that I am always committing errors,' and 'I approach things with the knowledge that I know that I will make mistakes' (Int.). This is well captured in the following quote by a manager:

> 'And that technical/professional things can also go wrong, everybody has already experienced that. Nobody is unfailing. And sometimes you make a wrong decision and you thought it was right, but indeed it was wrong. This can happen to anyone.' (Int.)

Another manager stated:

> 'It depends a bit on the person, if it is an intern or an associate I expect some errors to come across. I am not saying that such errors do not happen to me as a manager also … We are not machines, we are humans and we tend to make mistakes; so it is eventually about learning from them and at least ensuring that you are not making the same errors the next time.' (Int.)

The expressed awareness and open communication about errors struck us because it seemed to be uncommon and somehow unusual, especially in a German work context. Thus, we followed up on it. Further observations over time and the interviews indicated that this orientation toward errors included two main aspects. On the one hand, the auditors that we observed seemed to develop a considerable degree of *error anticipation (eo1),* as expressed in statements such as 'to err is human' and the related statements quoted above. This preoccupation of more experienced auditors with anticipating errors is also captured in the following quote by a manager. This quote is the reaction of a manager when a senior auditor told the manager that his audit team had finished one day ahead of time, an event that could actually be good news for the manager because it would indicate efficient auditing. However, this kind of event rarely occurs because teams usually work under high time pressure, so they usually do not finish early. Hence, the manager doubted that a rigorous audit could have been completed ahead of time, as he stated with disbelief:

> 'Last week, a senior came to my office. He told me that he had finished the job one day ahead of time. *Immediately, I got worried.*' (Int., emphasis added)

On the other hand, we found that individuals increasingly developed *error coping (eo2)* skills. An auditor expressed this as follows: 'Over time, you somehow experience an emotional blunting when something goes wrong.' Remarkably, we found that The Firm's auditors even had a name for this rather relaxed attitude—they called it 'Tiefenentspanntheit.' This 'Tiefenentspanntheit' was characterized by a strong tendency to restrain negative emotional reactions by suppressing emotions or reappraising the error situation whenever errors occurred. 'Tiefenentspanntheit' was a key characteristic that we found throughout our participant observation and interviews of more experienced auditors across national boundaries. A partner has expressed this distinct way of coping with errors as follows:

> 'If I got upset every time an error occurs then I would be doing nothing else. There are so many things that could upset you. … It doesn't help. You always have to look forward and tell yourself: OK, what are we going to do now in this specific situation?' (Int.)

The auditors themselves also made jokes about this increasing 'Tiefenentspanntheit,' as illustrated by an email that was circulated within The Firm. The email included four moving images of cats of different kinds representing junior auditors, senior auditors, managers, and partners. While the junior auditor cat was a skinny, hyperactive cat that went crazy pulling its hair, the senior cat was calmer and wore headphones, demonstrating a cooler, yet still considerably nervous, approach. The manager and the partner cats were increasingly dulled, with the most senior cat being a big, fat cat with thick fur, calmly moving its head.

Based on the observation of the development of the auditors over time, we continued to explore why the auditors for the most part—although with different degrees—underwent this development. Participant observation, particularly of first-year and second-year auditors, provided us with important clues. While the young recruits enthusiastically tried to do their best and prove themselves within the working world, most of them seemed to have a very hard first 'busy season.' Indeed, almost all of them were stressed out and expressed a certain apathy after their first busy season. In attempting to identify the causes of these phenomena, further participant observation and interviews helped us to understand that the development of skills to cope with the experienced stress resulted to a considerable degree from experiences with three standard formal procedures within The Firm that were applied at the audit team level: '*workpaper reviews*,' '*job rotations*,' and '*feedback*.' We next explore these formal procedures and their effect on individual junior auditors' development in more detail.

4.4. Team level: prevention procedures (PP)

4.4.1. Workpaper reviews (pp1)

In our participant observations, we found that workpaper reviews play an important role in explaining the stress experienced by the junior auditors. Workpaper reviews are a standard procedure to detect errors and prevent their accumulation in order to prevent audit team failures such as issuing a flawed audit opinion. The workpaper reviews are performed within the audit teams as a required formal and ongoing procedure. Whenever an audit step 'prepared' by an auditor is completed, a more senior auditor must 'review' the workpapers, which are documented either on paper or electronically. The review process is strictly organized in a hierarchical and 'cascaded' manner across multiple levels so that senior auditors review junior auditors, managers review senior auditors, and partners review managers. In turn, the entire engagement is often again reviewed by a team-independent reviewer (second partner review or engagement quality review). We found that the preventive function of the workpaper reviews resulted both from being a coercive mechanism to correct deviations from standard procedures and from motivating the auditors to work more diligently because they anticipated the review. Although this general notion of reviewing and being reviewed was deeply ingrained in the daily work of an auditor at The Firm, this is not to say that these workpaper reviews were always performed in accordance with standard operating instructions. Indeed, we also observed instances in which—at least allegedly—'not so crucial' audit procedures were reviewed in a superficial manner.

However, what appeared theoretically more interesting was the socializing role that the workpaper reviews apparently played with the individual auditors with regard to their *error orientation (EO)* by pointing out any errors made. During our participant observation within the teams, we found that young auditors had a rather

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ambiguous attitude toward these workpaper reviews. The senior auditor would regularly ask the subordinate junior auditors about 'what's ready to be reviewed.' During the time he or she reviewed the workpapers, we observed that the reviewed auditor had a keen awareness of all the signals the senior auditor provided that might indicate spotted errors in the workpapers. This concern was understandable, because the senior auditor has an important voice in the performance rating of the junior auditor. At the end of the review, the reviewer typically provided a review sheet with a (long) list of review notes that had to be addressed. We saw that these long lists were usually 'concerning' and even 'frustrating' for younger auditors. Although more senior auditors considered these long lists of review items as more 'normal,' the process of becoming accustomed to them took time and was never entirely complete. When discussing the review process in one of our interviews, a senior auditor expressed her experiences, as shown in the following quote. The quote captures the increasing awareness of errors and that 'everyone makes mistakes' and hints at the frustration that never seemed to vanish entirely:

> 'At the beginning, I was really concerned when I handed in an audit report for review to the manager and the partner, and I got it back all red. But, as you know, after a while, you really get used to it. It's simply not possible to get everything right, and you know … everyone makes mistakes.' (Int.)

4.4.2. Feedback (pp2)

A second important prescribed procedure that we associated with the auditors' socialization with errors was on-the-job feedback. At the end of an audit engagement (or after every two to four weeks on longer jobs), auditors were encouraged to obtain formal feedback for their on-the-job performance, which was an integral formal procedure after each completed job. This performance feedback covered strengths and weaknesses and was 'linked to promotions, salary, and the assignment of appropriate tasks' (Arc.). Auditors within The Firm were given feedback on a regular basis. Feedback requests were incentivized by linking the number of obtained feedback reports to the individual year-end bonus scheme. Specific job feedback was complemented every six months, with an overall discussion of the feedback collected over those months with a 'counselor' (Arc.) who would help the auditor reflect on 'personal development' (Arc.). All feedback reports and the resulting bonuses were discussed with the counselor and a partner in a 'year-end discussion' (Arc.). Because of their link to the bonuses, as well as to the reputation within The Firm, the feedback was loaded with tensions, including frustration, particularly after the year-end discussion. Furthermore, we found that certain auditors also used feedback as a control device for subordinate auditors' behavior by threatening that unwillingness to perform a task would be reflected in the 'rating for this job.'

Despite these issues, our observations suggest that feedback also served an important role in familiarizing auditors with errors because the feedback documented 'what went well and what did not go well on the job,' which saliently made the auditors aware of errors that they had to address and cope with. We think that it is for this reason that feedback was also considered ambivalent. On the one hand, everyone agreed that 'feedback is important' and that 'feedback helps,' as commonly expressed in statements such as 'I would like my senior to give more feedback.' On the other hand, junior auditors appeared especially afraid of requesting feedback. This fear was particularly apparent in the practice of postponing feedback reports. Junior auditors tended to delay requesting written feedback reports to the latest possible date. This postponement was justified with arguments such as 'there is too little time to do it.' However, this lack of time was only part of the explanation because requesting feedback took no longer than five minutes. Rather, the postponement was a result of a deliberate strategy that one partner called 'cherry picking' (Int.):

> 'They are hoping that maybe in the next job they perform better. So they will procrastinate and then at the end they will just cherry pick [… This is] to receive feedback only for the jobs in which they believe to have performed better.' (Int.)

This meant that junior auditors would wait for jobs to run more smoothly and then request feedback on these cherry-picked jobs. Since auditors expressed their concern that they could 'never perform at 100% because of the time pressure,' this practice of postponing the request for feedback reports continued 'until there was no other option than to request feedback reports' at year end.

4.4.3. Job rotation (pp3)

Another formal procedure in The Firm that we found to be relevant in auditors' socialization process was job rotation, which means auditors take on different tasks in different engagements or change roles over time. In practice, this means that during a busy season of six months, a junior auditor may well work on five to ten audit engagements depending on their length. Job rotation involves working in new teams, with new colleagues, at new sites, with new client personnel, in new industries, and on new accounting issues. In addition to this constant job rotation, auditors take on new responsibilities each year according to their new roles within The Firm's hierarchy, which means that even if auditors remain within the same audit engagement team, they will be assigned new tasks that they have not performed before. Although job rotation is usually not considered a classic preventive procedure and may even cause errors because of inexperience, several of our interviewees indicated that it may serve an important preventive function for The Firm in the long run for two main reasons. First, job rotation provides a multitude of auditing experiences for auditors, which were seen as important for the professional development of junior auditors in particular. In turn, this experience was thought to improve the professional judgment of auditors. Second, job rotation was deemed to be important because it forced auditors to take 'a fresh perspective' on the audited financial statements and related processes. As the managers and partners explained, each new colleague 'asks new stupid questions,' which was seen as a mechanism to prevent systematic audit errors. In addition, systematic audit errors—which often build up over the years—were seen as a severe risk.[19]

However, in addition to identifying these stated reasons for job rotation, we found that job rotation had a profound impact on auditors' socialization with respect to errors. Similar to workpaper reviews and feedback, auditors expressed very ambiguous feelings toward job rotation. On the one hand, they repeatedly expressed their appreciation of job rotation because it offered 'new

[19] This makes job rotation a double-edged sword in terms of preventing errors. Although the training-on-the-job and fresh-perspective aspects may prevent errors, the inexperience aspect may be an additional source of errors. Under ideal circumstances, the 'fresh perspective' institutionalized by the job rotation procedure may prevent systematic audit errors and their unquestioned repetition across audits, whereas the additional errors made because of job rotation should be caught by the workpaper review process or direct response of the supervisors to whom the 'new stupid questions' are asked. Job rotation is part of the *prevention procedures (PP)* category because this category captures those formal team-level procedures with a prevention function (in this case, only one of two 'edges of the sword') that our data and analyses suggest are important for auditors' socialization with errors, i.e., the auditors' development of an *error orientation (EO)*. Our subsequent findings clearly indicate that this is the case.

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challenges' and 'working with other colleagues,' along with a 'steep learning curve.' On the other hand, auditors also complained about the difficulties caused by constant job rotation. Most importantly, junior auditors felt that they 'could never do something properly' or that 'you never have the time to fully understand something.' We interpreted these statements as auditors' frustration about the frequent errors that they made because of a lack of experience when rotating jobs. This frustration also involved the feeling that they constantly had to make a tradeoff between ensuring that their work is finished on time and ensuring that it is free from material error. We believe that this was one of the reasons job rotation was described as stressful, as exemplified by the words of a senior manager:

> 'But sometimes, you know, you think about how it would be if you had a bit more steadiness in our job, not always new tasks and all this stuff. Just a bit more quiet.' (Int.)

4.5. Organizational level: organizational structures and systems (OS)

4.5.1. Quality and risk management system (QRM) (os1)

The workpaper reviews performed within the teams are a major coercive element of The Firm's organizational quality and risk management system (QRM). The QRM is a set of organization-wide policies, processes, and procedures intended to ensure that The Firm's services comply with professional standards and satisfy stakeholders' expectations. Specifications are derived from the International Standards on Auditing, which specify the goal of the QRM as a mostly preventive structure. At The Firm, this was expressed by a slogan related to the QRM 'to protect the firm and the clients' (Arc.). While the existence of the QRM was mostly accepted as being important for The Firm, the QRM also created frequent tensions when, e.g., quality procedures conflicted with the 'revenue goals' and 'profitability goals' of managers and partners, who complained about 'overregulation' and fought for 'client acceptance.' From an error management perspective, the QRM took an interesting dual role in preventing errors and resiliently handling them. On the one hand, the QRM was considered a classic preventive structure that standardized the audit process by, e.g., implementing a firm-wide 'audit methodology' and 'engagement quality reviews' at the engagement level, along with enforcing formal team procedures such as workpaper reviews. However, the QRM processes were also perceived as an enabling tool to better perform audit tasks. For instance, in the months after the busy season QRM-related processes such as the audit methodology were repeatedly updated based on the audit teams' experiences. Accordingly, the QRM was considered to comprise not only coercive mechanisms of quality enforcement but also best practice templates that required professional discretion and helped auditors improve their work.

4.5.2. Learning and development system (os2)

Closely related to the QRM is the learning and development system within The Firm. We found that The Firm engaged heavily in training and retraining its professionals. The training activities within The Firm followed different formats, such as 'training off the job' (training sessions), 'training on the job' (experiential learning during the engagement), and 'training near the job' (training others in training sessions). All these training elements were planned for each employee in a structured 'learning and development plan.' This plan established behavior 'expectations' and skillsets for each 'rank' (Arc.). These expectations begin with goals such as 'you manage your tasks and time appropriately' (Arc.) and 'you effectively lead teams' (Arc.) and become more revenue focused for higher ranks. As a result, specific role expectations and learning stages were standardized for each position and rank to assure a certain level of quality (and later on, revenue contribution) of the auditors in The Firm. This reflects the nature of professional organizations that entails a process of cognitive standardization (Larsson, 1977), and the learning and development plan is a critical HR mechanism in this endeavor. However, from an organizational perspective, this standardization also provided The Firm with the flexibility to quickly shift people between engagement teams. Taken together, although the learning and development system certainly emphasized error prevention through skilling, it also enabled The Firm to deal more resiliently with emerging crises as an organization through its ability to find and quickly draw on a global pool of experts with a certain set of skills.

4.5.3. Multidimensional matrix organization (os3)

The matrix structure organized The Firm along several dimensions, including geographical locations, service lines, and industries. While we found that these different dimensions created tensions within the organization, for instance, between service lines fostering particular professional standards and industries emphasizing local market knowledge and growth, it also became a powerful coordination framework for the organization's error management. Dealing with the multidimensionality of a matrix meant, in practice, that it became an organizational tool for enabling error management. Error prevention was enhanced by designing and maintaining institutionalized structures and procedures, which allowed the allocation and coordination of expertise within and across specialized departments or practice groups. These organizational structures not only encouraged the development of further expertise but also made operations more predictable by organizing accountability (e.g., who is in charge and who is responsible for what task). Simultaneously, however, the design of the multidimensional matrix—in contrast to a one-dimensional hierarchy—maintained the organization's flexibility, which enabled The Firm to respond more quickly to the unexpected. The matrix created arenas, in which complex problems could be discussed and handled by incorporating expertise that was not available within one's own organizational unit (e.g., engagement team, service line, etc.). It is this duality of the matrix that not only created a stable coordination device according to different axes of specialization but also enabled the ad hoc inclusion of new expertise.

4.6. Multi-level linking: self-reinforcing versus disruptive dynamics (L1, L2, L3, L4)

So far, we have introduced emerging patterns from our analysis on the organizational level, team level, and individual level mostly in isolation. We now more precisely develop how these levels of analysis interact and are linked through process relationships that unleash specific enabling or disrupting dynamics of the error management system as a whole. In particular, our findings suggest four major linking processes that connect elements on the three levels. These linking relationships are *the structure-team linking (L1)*, *the team-individual linking (L2)*, *the individual-team linking (L3)*, *and the team-structure linking (L4)*. In the following, we describe these links and outline the ruptures that may occur within these linking relationships, which may explain why error management may also fail.

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4.6.1. Structure-team linking (L1): translating structures into procedures

Above, we described that the *organizational structures (OS)* and systems of The Firm provide the organizational context in which the audit engagement teams operate. All three structures and systems involve numerous policies, processes, and procedures. Three of these associated team procedures particularly attracted our attention because of their error prevention role for the auditors. While these procedures ought to follow a firm-wide blueprint, we recognized that the implementation of these team procedures considerably depended on how they were interpreted and locally adapted to the specificities of the audit case by the local teams. For example, *workpaper reviews (pp1)* ought to be performed on a continuous basis during the audit. However, we observed multiple times that these reviews were performed long after the engagement team had finished their work on site, which renders timely and constructive feedback illusionary and impedes timely follow-up work. *Feedback (pp2)* within teams crucially depended on managers' and team leaders' interpretation of what constitutes appropriate feedback. While some managers considered that going without any major critique at the end of a job would mean praise for the team, others took much effort to provide detailed constructive feedback for each person within the team. Moreover, *job rotation (pp3)* often depended both on the overall staffing situation within the local offices and on the negotiation skills of the engagement manager staffing the jobs. Therefore, the actual implementation of the procedures heavily depended on how general structural templates were translated locally and adapted to specific conditions by local audit teams and their leaders.

4.6.2. Team-individual-linking (L2): socializing individuals

Our findings indicate that *workpaper reviews (pp1)*, *feedback (pp2)*, and *job rotation (pp3)*—what the base literature on error management may consider *preventive procedures (PP)*—served an important role in socializing auditors in addressing errors. Particularly, our findings suggest that the auditors develop an increasing *error orientation (EO)*, which comprises elevated *error anticipation (eo1)* and pronounced *error coping (eo2)* skills. Both workpaper reviews and feedback are coercive mechanisms to detect deviations from standard procedures or expected behaviors. Repeatedly outlining such deviations—or errors—sensitizes the auditors to errors occurring. To address the experienced ubiquity of errors, the auditors develop emotional and cognitive strategies to cope with them. Additionally, we found that the socializing effect may be associated with the constant job rotation that permanently involves working on new tasks. Although job rotation was considered to have a preventive function through bringing in 'fresh perspectives'—helping to prevent systematic audit errors and their repetition across audits—it also involved individual auditors making more errors, further sensitizing them to errors.

However, this socialization function connecting *prevention procedures (PP)* with individual *error orientation (EO)* also often failed. Our findings indicate that a number of factors contributed to this failure. For example, junior auditors postponed the completion of audit steps until the end of the audits in the hope that the *workpaper reviews (pp1)* would be less detailed because of the increasing time pressure for the reviewers. The procedure of *job rotation (pp2)*—which is intended to acquaint auditors with different sets of experience—in some instances became instead a replication of highly similar jobs and client issues, which then failed to stimulate much professional learning or a 'fresh perspective.' Furthermore, *feedback (pp2)* was sometimes hand-picked for jobs that went well to avoid critical feedback reports. Overall, the procedures created a high level of stress. Our findings indicate that this stress caused sleeping disorders, health issues, and frequent complaints, which were often also considered as reasons for quitting the job.

4.6.3. Individual-team-linking (L3): mobilizing reflection-in-action

We described above how individual *error orientation (EO)* may facilitate resilient practices emerging within teams—*realizing what is going on (rp1)*, *cool-headed error handling (rp2)*, *triangulation in practice (rp3)*, and *informed decision making (rp4)*. More specifically, our findings suggest that individual *error anticipation (eo1)* and *error coping (eo2)* are crucial psychological predispositions for engaging in *resilient practices (RP)*. For instance, we suggest that without the necessary *error anticipation (eo1)* skills, auditors would simply not engage in the practice of *realizing what is going on (rp1)* and would hardly engage in the practice of *triangulation in practice (rp3)*. Both require the anticipation of errors. Moreover, *error coping (eo2)* skills enable relatively unemotional or *cool-headed error handling (rp2)* and *informed decision making (rp4)* within teams. This is because error coping is associated with emotional regulation and cognitive strategies to address errors when they occur (Rybowiak et al., 1999).

Nevertheless, our findings also indicate that the emergence of resilient practices within teams is very fragile. For example, we repeatedly observed a breakdown in *realizing what is going on (rp1)*, which occurred particularly in teams in which the team leader was relatively authoritarian, which inhibited—or at least did not encourage—quick informal information sharing. Breakdowns also occurred when other reasons impeded quick communication, sometimes as simple as working in different rooms. Another example is that *informed decision making (rp4)* did not always work the idealized way in practice. Particularly young auditors sometimes felt anxious to admit that they did not possess the knowledge to solve an accounting issue. In other cases, these knowledge gaps led the auditors to postpone the respective task and instead move on to work on other tasks because they felt the pressure to 'get their stuff done.' Our findings suggest that both instances interfered with *informed decision making (rp4)* because errors were not communicated quickly enough, which often led to problems that impeded the quality of the audit.

4.6.4. Team-structure linking (L4): updating structures

Considering the error resilient interaction within the audit teams helped us to make more sense out of the double role of the *organizational structures (OS)* of The Firm. While these *organizational structures (OS)* were considered mostly as enablers of error prevention, they also allowed the organization to resiliently react to occurring errors. The underlying principles of *organizational structures (OS)* are similar to the principles of the *resilient practices (RP)* within teams, namely, to being able to quickly detect and react to errors, however, on an organizational level. Based on this observation, we suggest that the resilient practices' underlying principle of flexibly adapting to new situations becomes institutionalized and is reflected within *organizational structures (OS)* over time. However, the updating of formalized structures and systems is also fraught with ruptures. For example, while the off-busy season during the summer months was often used to update templates, processes, and systems for the upcoming busy season, these continuous changes faced resistance. This resistance is nicely captured by the frustration expressed by an audit team leader during a meeting of all auditors from one office:

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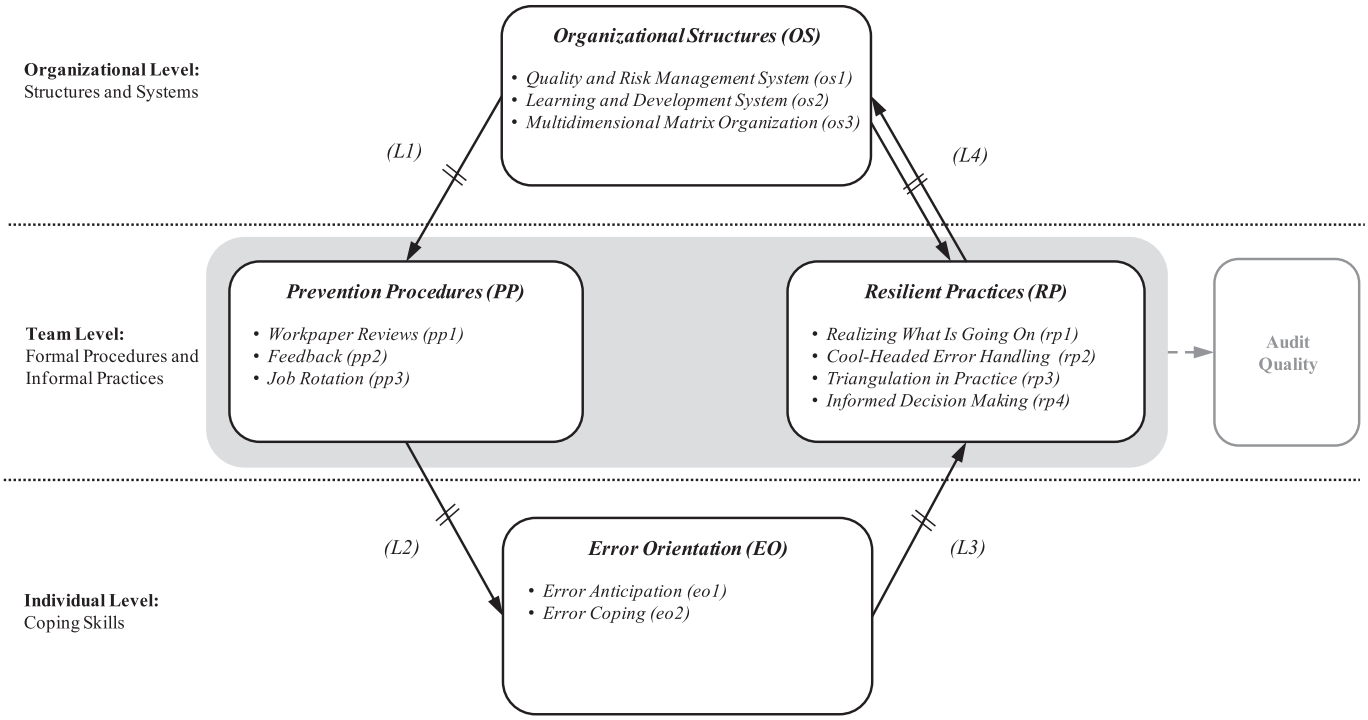

Codes for arrows:
(L1): Structure-team linking and ruptures; *(L2)*: Team-individual linking and ruptures; *(L3)*: Individual-team linking and ruptures; *(L4)*: Team-structure linking and ruptures.
Ruptures are indicated as double lines that interject the linking relationships.

Fig. 2. Multi-level model of error management.

'I have been at The Firm for five years now. And in three out of these five years there was a new feedback system [for the formal feedback requests] that I had to use. *Why can we not simply choose one and stick with it?!*' (emphasis added)

5. Toward a multi-level model of error management in accounting firms

The case study findings developed in the previous chapter suggest a multi-level error management model, which is summarized in Fig. 2[20]. The underlying idea of this multi-level model is that error management in accounting firms may be understood—under ideal conditions—as the result of a self-reinforcing system that embraces multiple levels of analysis. More specifically, we suggest that *organizational structures and systems (OS)*, formal *prevention procedures (PP)* performed at the team level, the individual auditors' *error orientation (EO)*, and informal shared *resilient practices (RP)* in teams interact and jointly constitute and reconstitute each other. However, we also find that this ideal self-reinforcing system is fraught with ruptures that explain why error management in accounting firms may also fail (ruptures are indicated as double lines that interject the linking relationships *(L1)*, *(L2)*, *(L3)*, and *(L4)* within Fig. 2). A basic premise of the model is that audit quality is a result of the work of the audit team (audit team level, with a gray background in Fig. 2), which can only be understood comprehensively by moving one level down (individual level) and one level up (organizational level) (Hackman, 2003). In this chapter, we further develop and specify the multi-level error management model by reflecting it against the extant body of literature in two steps. First, we reflect the 'Top-down path: from the organizational level to the individual level' of the model against the literature and second, we reflect the 'Bottom-up path: from the individual level to the organizational level.'

5.1. Top-down path: from the organizational level to the individual level

The described *organizational structures and systems (OS)* provide firm-wide organizational policies and processes in an attempt to coordinate the work of audit teams across more than 500 offices in more than 100 countries. Drawing on the work of Barrett et al. (2005), we conceptualize these *organizational structures and systems (OS)* as abstract templates for action through which administrative power and control is exercised within accounting firms (Barrett et al., 2005). By reproducing these abstract templates in local audit work, they provide consistency and coherence in what auditors do across time and location (Barrett et al., 2005). Part of these overall organizational structures and systems are procedures that are performed within the local audit teams. In particular, the *workpaper reviews (pp1)*, *feedback (pp2)*, and *job rotation (pp3)* procedures emerged as important elements in understanding error

[20] Note that the arrows in the model indicate a dominant path of effects as suggested by our data and analyses; however, they do not indicate an exclusive, causal step-by-step phenomenon.

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management within The Firm.[21]

However, we also found that the appropriation of these structures and procedures within the local audit teams was sometimes problematic. We have described these problems as ruptures within the *structure-team linking (L1)*. These ruptures occur when the abstract templates are interpreted and re-embedded in the local team context in inadequate ways (Barrett et al., 2005). We have described how *prevention procedures (PP)* were not performed as designed by illustrating, e.g., bad *workpaper reviews (pp1)*, delayed *feedback (pp2)* (see Thornock, 2016, for the negative effects of delayed feedback), or malfunctions in *job rotations (pp3)*. Such ruptures have also been a matter of concern in the behavioral audit quality literature that examines reduced audit quality behaviors (RAQs) (e.g., Coram, Glavovic, Ng, & Woodliff, 2008; Malone & Roberts, 1996). This literature has highlighted the role of auditors' actions that deviate from predefined procedures, which increase the risk of forming an inappropriate audit opinion (Coram et al., 2008; Malone & Roberts, 1996). Consistent with this literature, our findings indicate that RAQs are particularly likely to occur when teams work under high time pressure (Pierce & Sweeney, 2004) and when auditors perceive the strength of the quality control system to be low (Malone & Roberts, 1996).

However, our study extends these literatures on deviant behaviors and RAQs in one important aspect. Although our findings are consistent with the literature indicating that RAQs have a *direct* negative effect on audit quality by ultimately hindering audit teams in getting to know about (and then adequately addressing) potentially remaining errors in the audited financial statements (e.g., Malone & Roberts, 1996; Pierce & Sweeney, 2006), the multi-level model of error management also suggests a negative *indirect* effect of RAQs on audit quality. Specifically, we find that RAQs may affect how junior auditors are socialized with respect to errors. Our study suggests that adequate performance of the *prevention procedures (PP)* increases junior auditors' *error orientation (EO)* by accustoming them to the 'normality' of errors and suitable ways to address them. Because—according to our model—this *error orientation (EO)* enables the emergence of *resilient practices (RP)* (as further discussed in the following subsection on the bottom-up processes), this *error orientation* is crucial for the provision of audit quality. In case of deviations in performing the *prevention procedures (PP)*—such as when engaging in RAQs—the socialization effect may be less intense or even divert to 'learning how to suppress errors' instead of accepting them as 'normal' and how to appropriately address them. Thus, engaging in RAQs may likely have negative consequences for junior auditors' *error orientation (EO)* and, ultimately, the audit quality provided by audit teams.[22]

By outlining this socializing function of error prevention procedures, our findings also connect to the debate on auditors' socialization (Anderson-Gough, Grey, & Robson, 1998, 2000, 2001, 2005). This literature stressed the socializing effect of procedures and techniques (Anderson-Gough, Grey, & Robson, 2001, 2005, 1998; Covaleski et al., 1998) regarding social knowledge about becoming a 'professional,' along with adequate 'conduct,' including modes of dress, suitable behavior, and discourse with the client (Anderson-Gough et al., 1998, 2001, 2005). This literature also outlined the associated issues of auditors' socialization in struggles over identity (Covaleski et al., 1998) and gendering effects (Anderson-Gough, Grey, & Robson, 2005).

We complement this literature on the socialization of junior auditors by explaining the functioning of the socializing process with respect to skills in coping with errors, i.e., what we have described as the development of an *error orientation (EO)*. Gendron and Spira (2009) have argued, albeit in a different context, that experiencing atypical events such as errors may lead 'individuals to engage in acts of reflective interpretation that can ultimately modify their interpretive schemes' (Gendron & Spira, 2009: 990). This modifying process can be specified by drawing on the error coping literature (Lazarus, 1993; Rybowiak et al., 1999), suggesting that the development of an *error orientation (EO)* by auditors reflects the learning of skills and strategies to anticipate and emotionally and cognitively cope with errors within the error-prone environment of auditing. The observed *error anticipation (eo1)* resonates with proactive coping strategies, i.e., the processes of anticipating potential stressors (such as errors) to reduce their emotional impact (Rybowiak et al., 1999). The findings on *error coping (eo2)* reflect the development of both cognitive and emotional strategies to address the occurring errors and the associated problems (Lazarus, 1993; Rybowiak et al., 1999).

However, our findings also reflect the struggles of the auditors associated with this particular socialization process. This process is indicated by the junior auditors' reporting that they often suffered from stress, showed a certain apathy after the first busy season, and experienced work-related health issues. Related struggles are also the focal theme of an emerging literature that has focused on the emotionally and cognitively stressful aspects of auditing (Guénin-Paracini, Malsch, & Paillé, 2014; Guénin-Paracini, Malsch, & Tremblay, 2015; Kornberger, Justesen, & Mouritsen, 2011). For example, Guénin-Paracini et al. (2014) have described the fear associated with the audit process. Similarly, Kornberger et al. (2011) describe 'the big mountain' that they 'put in front of you' as managers. While the focus of their study is on identity formation, these authors also find evidence of a high level of stress and some fear when auditors become managers.

Our study builds on and extends this emerging stream of literature by outlining the emotional and stressful struggles of junior auditors in their socialization with the plethora of errors in auditing. Thus, it highlights the role of formal procedures in contributing to the stress and fear that junior auditors are especially likely to experience with respect to *workpaper reviews (pp1)*, *feedback (pp2)*, *and job rotation (pp3)*. In addition, we suggest that auditors learn to cope with these stressors to a certain degree by anticipating errors and developing emotional and cognitive coping strategies, which are reflected by the two components of the *error orientation (EO)* construct. However, there seem to be individual differences in how well junior auditors learn to cope with the stressful aspects of

[21] Drawing on our empirical findings and the base literature on error management, we suggest that all three procedures have important preventive functions (this does not mean, however, that they do not also serve other important functions). As described in the 'Case findings' chapter, the prevention function of workpaper reviews and formal engagement feedback consists of both (1) being coercive mechanisms to enforce certain standard procedures, and (2) increasing the auditors' motivation to work more diligently. Furthermore, the preventive function of job rotation is to uncover systematic audit errors within audit teams by bringing in a 'fresh perspective.' Although job rotation also has educational and pragmatic staffing purposes (and may produce some new individual errors), our findings indicate that job rotation is nevertheless considered as a means to prevent systematic audit errors within audit teams because new auditors bring a fresh perspective that may uncover blind spots and false assumptions in the audit approach. This view, as expressed by auditors within our study, resonates with the base literature on error management and particularly the research on high-reliability organizations (e.g., Weick et al., 1999), which stresses the idea of adopting multiple perspectives to uncover false assumptions and thus to prevent systematic errors.

[22] A similar negative long-term effect of flawed procedures also seems to be indicated in a recent study by Westermann et al. (2015), in which the authors look at the role of feedback as part of auditors' on-the-job learning for the development of junior auditors. In a footnote, the authors report that audit partners increasingly lament the quality of feedback within audit teams and their detrimental long-term effects. The argument is that feedback is an important mechanism for developing junior-level auditors into reflective practitioners, and thus any decrease in the quality of feedback should be of concern. We think that the concept of an error orientation and that of the reflective practitioner are related.

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auditing. Future research will have to examine these individual differences in more detail.

5.2. Bottom-up path: from the individual level to the organizational level

Our findings indicate that an individual's *error orientation (EO)* facilitates the emergence of what we have described as shared *resilient practices (RP)* within the teams. Individuals who share a similar (functional) orientation toward errors can engage in shared practices to address them effectively (Frese & Keith, 2015; Weick & Roberts, 1993). Following action theory (Frese & Zapf, 1994), individuals regulate their activities based on information or signals they receive when they orient themselves in their environment (Frese & Zapf, 1994). A particularly strong *error orientation (EO)* regulates auditors' activities with regard to anticipating and coping with errors (Rybowiak et al., 1999). Although the effect of individual orientations on collective action related to errors is little explored in the accounting literature (Gronewold & Donle, 2011), it resonates with a stream of the base literature from the error resilience camp often referred to as high reliability organizations (HROs) (e.g., Weick & Roberts, 1993; Weick et al., 1999). The literature on HROs examined organizations that work in a manner that is highly reliable under error-prone circumstances, such as in the cases of aircraft carriers, emergency room teams, and firefighters. In an attempt to summarize what makes HROs distinct, Weick et al. (1999) indicate that HROs share certain informal practices that enable them to resiliently manage unexpected events. However, they suggest that these resilient practices are rooted in collectively shared cognition (Weick et al., 1999). Our findings address this general idea in the audit context, indicating that a shared *error orientation (EO)* among individuals enables the emergence of shared *resilient practices (RP)* within the audit teams. Based on these findings, we propose that both theory and practice may benefit from transferring insights from the HRO literature to the accounting field. This may be a promising path to further develop the notion of *resilient practices (RP)* in auditing.

A related growing stream in the accounting literature that introduced the idea of the relevance of shared *resilient practices (RP)* for audit quality is the error management climate literature (Gold et al., 2014; Gronewold & Donle, 2011; Gronewold et al., 2013). This literature is concerned with shared practices to address occurring errors. The focal argument has been that an error management climate—by affecting, for instance, how individuals communicate occurring errors (Gold et al., 2014)—influences audit quality. Our study connects to this stream of literature and contributes to it in two main ways. First, while our findings support the general relevance of *resilient practices (RP)* for the production of audit quality, we move from the relatively abstract notion of an error management climate toward describing the shared and actually applied practices involved. As such, we put some empirical 'flesh on the bones' to what auditors actually do in their daily activities as part of a high error management climate (e.g., Gold et al., 2014; Gronewold & Donle, 2011). Second, the multi-level model of error management extends the literature on error management climate in accounting firms in an important theoretical aspect. So far, the literature remains largely silent about how shared practices actually emerge and, hence, an error management climate actually evolves,[23] except for some general assumptions, such as that the 'tone at the top' is a potentially relevant factor (e.g., Gold et al., 2014; Gronewold et al., 2013). In this regard, our study sheds light on the emergence of shared *resilient practices (RP)*, which seem to be much more distributed and bottom-up driven than currently discussed in the audit literature.

However, we also demonstrate that the emergence of shared *resilient practices (RP)* within teams is fraught with ruptures. We describe how the interrelated practices sometimes became less effective. This implies moving away from an ideal situation and toward a less effective error management climate or, to employ Weick and Roberts' (1993: 371) term, moving toward 'heedlessness' in teams. Particularly, when, e.g., more authoritarian managers discouraged open debates, the interrelation of practices became less effective. Weick and Roberts (1993: 371) again point to this phenomenon: '(a)s interrelating deteriorates and becomes more primitive, there is less comprehension of the implications of unfolding events, slower correction of errors, and more opportunities for small errors to combine and amplify.' Our findings on the ruptures in the emergence of the *resilient practices (RP)* and the resulting multi-level model suggest that the ruptures undermine a productive interrelating of *resilient practices (RP)*, which entail negative effects on the resulting quality of the audit.

Furthermore, our study indicates an important area for future research that converges around the question of how existing relevant *organizational structures (OS)* are updated and changed. We explained that the organizational structures related to error management play a double role. On the one hand, they are somewhat coercive and 'are designed to force reluctant compliance and to extract recalcitrant effort' (Adler & Borys, 1996: 69). On the other hand, they provide The Firm as an organization with great flexibility to react to unexpected events. In particular, the flexibility and enabling role of the described *organizational structures (OS)* resonate with the underlying principles of *resilient practices (RP)* to quickly react to errors occurring within audit teams.[24] Based on these observations, we theorized that auditors' daily interaction within audit teams becomes manifest and changes *organizational structures* (OS) over time. This theorizing follows a line of thinking that has outlined the idea of the duality of structure and agency (Barrett et al., 2005; Dirsmith et al., 1997; Giddens, 1984), along with practice theory (Whittington, 2007, 2011). Following these lines of thinking, scholars have argued that structures both 'influence and are influenced by social actions in the day to day activities across time and space' (Dirsmith et al., 1997: 4). The outlined multi-level model resonates with this general idea by describing both a top-down and a bottom-up path involved in error management. Our own study only shows the first indications of such a practice-driven path to organizational change in accounting firms. We believe that a promising theoretical lens in conducting research in this domain is the emerging research stream on institutional work that addresses how agents create, maintain, and transform institutionalized structures (e.g., Lawrence, Leca, & Zilber, 2013; Lawrence, Suddaby, & Leca, 2009).

6. Concluding discussion

In this paper, we have suggested that taking an error management perspective may be an insightful lens to develop an understanding of how audit quality is produced within accounting firms. Drawing on a comprehensive case study including extensive fieldwork of 18 months of participant observation, 38 interviews,

[23] This is even true for the wider research on work climates and culture, as indicated by a comprehensive review study on work climates that 'failed to uncover a single study aimed at modeling and testing the processes by which such changes in work climates emerge' (Kuenzi & Schminke, 2009: 707; see also Gronewold et al., 2013: 204, for a discussion of this question as an issue for further research).

[24] In Fig. 2, this enabling role of *organizational structures (OS)* for *resilient practices (RP)* is indicated by the arrow that goes from *organizational structures (OS)* to *resilient practices (RP)*.

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and archival materials, we have proposed a multi-level model of error management in accounting firms. This model explains that to understand the operational production of audit quality within audit teams, it is crucial to consider *both* the role of formal error prevention *and* the role of informal error resilience, along with how the two interact across multiple levels of analysis. In particular, this research suggests that we should pay more attention to error management as a multi-level interaction system because the components of the multi-level model are supplementing and complementing each other and may neither work nor be studied properly in isolation. In short, error management becomes self-reinforcing when coherent and coordinated, and disruptive when fragmented and undermined by contradictory practices and arrangements.

This study makes several overarching contributions to the audit quality and error management literatures. First, the multi-level model of error management contributes to the behavioral and social audit quality literature by pointing to a conceptual integration of discussions in the literature on the role of organizational quality control structures (e.g., Malone & Roberts, 1996), team workpaper review and feedback procedures (e.g., Ramsay, 1994; Westermann et al., 2015), shared team resilient practices (e.g., Gold et al., 2014; Gronewold & Donle, 2011), and individual cognitions and emotions (e.g., Guénin-Paracini et al., 2014). These streams had mostly been thought of and discussed in isolation, despite indications of interactions. The multi-level model of error management suggests a way forward toward systematically integrating the multiple insights in the literature by showing how QRM structures, prevention procedures such as workpaper reviews, individual error orientation, and resilient practices interact. Accordingly, we hope that the multi-level model of error management opens a fruitful alley for future research by applying this novel framework to how audit quality is produced in practice.

Second, the multi-level model contributes to the growing stream within the behavioral audit literature on error management in accounting firms. To date, this stream has mostly focused on the specific aspects of error management climate and error reporting (Gold et al., 2014; Gronewold et al., 2013). Our model contributes to this literature stream both by capturing error management in accounting firms as a broader construct beyond error reporting and by explaining how error management practices emerge and how they are performed. This conveys an understanding, under which conditions a broad set of resilient-type shared error management practices (that previous studies have subsumed under the more abstract notion of an 'error management climate,' which typically has been experimentally 'set' in those studies) may evolve in accounting firms in practice.

Third, the multi-level model of error management also contributes to the base literature on error management. Although previous research (often with a psychological or sociological background) has repeatedly stressed the great divide between the error prevention camp and the error resilience camp, little research has attempted to examine the interplay of these two approaches (Goodman et al., 2011). The initial research, which has indicated that error prevention and error resilience may co-occur (Vogus & Sutcliffe, 2007a, 2007b), remains vague about 'the mechanisms through which these two approaches combine' (Goodman et al., 2011: 165). By examining error management in accounting firms, we can suggest such a mechanism by considering multiple levels of analysis. Although the previous base literature on error management has stressed the function of organizational structures and procedures in preventing errors (Goodman et al., 2011), the same literature has overlooked the socializing function of some of these aspects for the individual's *error orientation (EO)*. As we have argued, this socialization of an individual's *error orientation (EO)* is crucial for the emergence of *resilient practices (RP)* within the audit teams. Thus, our case findings suggest that *prevention procedures (PP)* not only prevent an accumulation of errors and subsequent failure but also may become the breeding ground for the emergence of *resilient practices (RP)* within teams. Future research may examine under which conditions this mechanism holds by studying the interaction in different organizational contexts.

Finally, by describing and explaining the multi-level interplay of the role of error prevention and error resilience, our study may also inform audit practice and its regulation. From early on, oversight bodies have highlighted the importance of accounting firms' 'tone at the top' in their inspections of the firms' quality control systems, i.e., the relatively 'soft' basis of a high-quality culture in an accounting firm. However, in recent years, oversight reports and pronouncements have increasingly emphasized that 'hard' management control instruments, such as promotion, evaluation, and remuneration criteria, may be the root causes of observed deficiencies at the audit process level via establishing inappropriate incentives with regard to audit quality (Financial Reporting Council [FRC], 2012; Public Company Accounting Oversight Board [PCAOB], 2008; see also Gold et al., 2014; for a related discussion of this debate). Consequently, accounting firms are urged to appropriately align their management control instruments, hold their personnel accountable for achieving high audit quality (e.g., PCAOB, 2013), improve supervision and review (e.g., PCAOB, 2014), and even stipulate disciplinary sanctions in the event of quality deficiencies (PCAOB, 2008, 2012; see also PCAOB, 2014, emphasizing possible disciplinary action on behalf of oversight in response to discovered deficiencies).

At first glance, the emphasis that oversight bodies place on management control procedures appears consistent with the multi-level model of error management because the model also emphasizes the relevance of formal *organizational structures (OS)*, along with formal *prevention procedures (PP)*. However, the multi-level model suggests that individuals' *error orientation (EO)* and *resilient practices (RP)* are similarly important for the production of audit quality. Therefore, our research supports the notion that it would be appropriate for oversight bodies to re-balance their focus between 'harder' and 'softer' aspects of quality control. Although focusing on 'hard' management controls may be convenient from an inspection point of view, re-balancing the focus toward the 'softer' aspects such as assessing *error orientation (EO)* and *resilient practices (RP)* and the necessary 'bottom-up' processes to enable them may be similarly or even more revealing for underlying reasons for audit 'deficiencies' at the outcome level. Capturing and assessing individuals' *error orientation* and the largely informal *resilient practices (RP)*—along with the largely 'bottom-up' driven processes that entail their emergence—is undoubtedly a challenging task. However, it may be crucial in order to comprehensively understand the fragile interaction within accounting firms that underlies the production of audit quality in the long run.

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