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Audit Senior Modeling Fallibility: The Effects of Reduced Error Strain and Enhanced Error-Related Self-Efficacy on Audit Juniors' Responses to Self-Discovered Errors

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ABSTRACT: This paper examines the relationship between audit seniors discussing their own experiences with committing and correcting errors (modeling fallibility), and audit juniors' thinking about errors and error communication (openly discussing their own self-discovered errors). The paper investigates the direct relationship between senior modeling fallibility and juniors' responses, and whether the relationship is mediated through error strain and error-related self-efficacy. Survey data from 266 audit juniors from two Big 4 Canadian accounting firms showed a direct positive association between audit senior modeling fallibility and audit juniors' thinking about errors, and error communication. This relationship is positively mediated through error-related self-efficacy. We also found that the relationship is mediated by error strain. However, although audit senior modeling fallibility was associated with reduced error strain, error strain was positively related to both thinking about errors and error communication, contrary to our hypothesis. The paper discusses the theoretical and practical implications of these results.

Keywords: senior modeling fallibility; audit juniors' responses to self-discovered errors; thinking about errors; error communication.

I. INTRODUCTION

This paper proposes and tests a model that examines the relationship between audit seniors discussing their own experiences with committing and correcting errors, which we term modeling fallibility, and audit juniors' behaviors and responses with respect to their own self-discovered errors. We hypothesize a direct positive relationship between audit seniors' modeling fallibility and audit juniors' responses to self-discovered errors, positive referring to the increased extent to which audit juniors engage in effortful activities in order to correct and prevent future errors after error occurrence. We analyze whether the relationship is mediated by error strain (reduced emotional strain resulting from fear of making errors) and error-related self-efficacy (enhanced confidence in one's ability to handle errors and associated problems). Our analyses are based on survey data from audit juniors employed by two Big 4 accounting firms in Canada.

The role of the audit senior, who has the overall responsibility for the conduct of the team members at the client's premises (sometimes known as fieldwork), is significant to the success of the juniors in two respects. First, it is by observing the senior that the juniors can acquire the advanced professional skills and professional judgment that they need to perform well on-the-job. The juniors, through their university and professional education, already have well-developed technical skills. It is through on-the-job experience (e.g., by observing senior auditors) that they will acquire the professional judgment necessary to make use of those technical skills. The audit senior provides a role model for the juniors to follow by providing guidance on how to identify, collect, assemble, and interpret evidence; insights into the interpretation of uncertain evidence; and guidance as to what the junior auditors should "do next." Westermann, Bedard, and Earley (2015, 864) characterize the audit senior as "an experienced guide [who] shows the learner (audit junior staff) how to perform a task."

Professors Emby and Zhao share first-authorship.

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Second, during the engagement, the junior's performance in the audit team is constantly being assessed by the senior, culminating in a formal assessment at the end of the audit. The engagement manager and the engagement partner have the ultimate responsibility for the formal assessments, but since their direct interaction with the junior during the engagement tends to be limited, in doing so they rely on the "front line" assessments of the senior. The junior's success as a team member is a critical determinant of their success in the firm in which they work, and in their prospects for success and advancement in that firm. The fact that the senior, who in addition to being a role model, assesses the performance of the junior on the engagement, is willing to discuss his or her own errors, is a strong signal that making errors is a normal part of the learning process and that admitting those errors and using them as a learning tool is appreciated.

Findings from this study contribute to the literature on error management in audit teams for the purpose of enhancing audit quality. Error management emphasizes constructive error prevention and handling and has received much attention in the organizational studies literature (e.g., Frese and Keith 2015; Lei, Naveh, and Novikov 2016; van Dyck, Frese, Baer, and Sonnentag 2005; Zhao and Olivera 2006). An increasing number of studies have examined this concept in the accounting and auditing literature (e.g., Stefaniak and Robertson 2010; Gold, Gronewold, and Salterio 2014; Gronewold and Donle 2011; Gronewold, Gold, and Salterio 2013; Seckler, Gronewold, and Reihlen 2017). A consistent finding from the accounting and auditing research is that "errors were ubiquitous in audit teams" (Seckler et al. 2017, 9) and that individual members' error coping responses play a critically important role in effective error management.

The previously cited studies in auditing have largely focused on how the overall error-management climate influences individual auditors' behaviors. This study focuses on a concrete managerial practice. Following Stefaniak and Robertson (2010), we are interested in studying the role of audit seniors in juniors' error coping. In particular, this study looks at a specific, on-the-job exemplar of an open error-management climate (e.g., Stefaniak and Robertson 2010; Gold et al. 2014; Gronewold and Donle 2011), audit senior modeling fallibility, a specific interaction between the audit senior and audit junior. In doing so, our study identifies a practice that superiors and firms can employ to enhance "individual coping skills and informal shared resilience practices that emerge in social interaction," which have been found to be crucial in promoting constructive error management at the individual, team, and organizational levels (Seckler et al. 2017, 5).

This study extends prior research findings in the auditing domain by examining how audit senior modeling fallibility influences audit juniors' behavioral responses to their self-discovered errors. Prior work in organizational studies has provided evidence that team leaders' attitudes and behaviors play a key role in error management (such as learning from errors) at the individual/team level (e.g., Edmondson 1999; Zhao 2011). Similarly, in accounting and auditing, Stefaniak and Robertson (2010) found that superiors' prior constructive, learning-oriented responses to errors would lead to a greater willingness of subordinates to admit errors.

We examine junior auditors' behavioral responses to their own errors that go beyond admitting errors. Given the pivotal role individuals play in effective error management (e.g., Gronewold and Donle 2011; Seckler et al. 2017), we study to what extent junior auditors engage in effortful activities so they can correct errors after error occurrence or prevent errors in the future. Hence findings from this study further our knowledge concerning error management (e.g., error admittance, error communication, error coping) in the accounting and auditing literature.

Overall, the results show that audit senior modeling fallibility was positively associated with juniors' error resilience responses both directly and indirectly. Indirectly, it both reduced error strain on the part of juniors, and enhanced their feelings of error-related self-efficacy. Juniors' feelings of enhanced error-related self-efficacy were positively associated with juniors' effective error-handling responses, suggesting that seniors be encouraged to be open about sharing their own error-related experiences as a way of enhancing juniors' constructive error coping responses and as a way of reducing audit quality reducing behaviors. Although senior modeling fallibility was negatively related to juniors' error strain, error strain was positively associated with juniors' effective error coping responses.

II. BACKGROUND, MODEL AND HYPOTHESES DEVELOPMENT

Audit firms see themselves as "learning organizations" (e.g., Peecher, Schwartz, and Solomon 2007; Andrews and Freeman 2001) whose job is to facilitate the education/training of new audit firm members. The commission of errors by juniors is not uncommon as they learn new tasks in a highly intense work environment (Seckler et al. 2017). This study proposes, as a concrete example of a behavior that signals recognition of errors as an opportunity for learning, "team leader modeling fallibility" (Edmondson 2012), which we characterize in this context as the audit senior openly acknowledging and discussing his or her own errors.

Our study is consistent with the error resilience perspective of error management (Goodman et al. 2011) and focuses on what could be done to cultivate and enhance individual error resilience (i.e., individuals constructively responding to, and handling their own errors). In order to better understand the effects of error management climate on audit quality, Seckler et al. (2017) performed an in-depth case study of a Big 4 audit firm by using archival data together with participant observation and

extensive semi-structured interviews with auditors at all levels in the participant firm. A key finding from this ethnographic study is that individual auditors' error coping skills critically determine the effectiveness of error management, which, in turn, affects audit quality. Furthermore, Gronewold and Donle (2011) developed scales to measure the construct of organizational error climate in audit organizations and analyzed its influence on auditors' predisposition to handling their own errors. Their survey of external, internal, and public-sector auditors at various levels of seniority found that an audit organization's error climate positively influences that predisposition. An experimental study by Gronewold et al. (2013) contrasted the effects of an open error management climate versus a blame-oriented error management climate on participants' beliefs about an auditor's willingness to report self-discovered errors and found a positive effect of an open error management climate. An experiment by Gold et al. (2014) manipulated participants' perceptions of the audit firm's error climate (an open climate versus a blame climate), and the originator of the error (self-discovered versus a peer's error). They found that an open error management climate resulted in an increase in the reporting of mechanical (but not conceptual) self-made errors and all peer errors. Additional analysis suggested that the result with respect to conceptual errors may stem from the auditor's own impression management concerns.

A recent study by Grohnert, Meuwissen, and Gijselaers (2018) on Dutch audit juniors found that audit juniors' "help-seeking" from hierarchical superiors depends on juniors' perceptions of the firm's learning from errors climate. Audit juniors who perceived a supportive climate sought help more frequently than those who perceived a less supportive climate. Audit seniors' modeling fallibility would be a strong signal that the organization has an open and supportive error climate and could act to pre-empt concerns about seniors' negative reactions to audit juniors' acknowledgment of their own errors. Our expectation that seniors' modeling fallibility would be positively related to juniors' willingness to communicate about their self-discovered errors is also supported by van der Rijt et al. (2013), who found that financial professionals were more likely to seek help from knowledgeable colleagues when those colleagues were accessible (defined as the degree to which a potential help provider's expertise is available in a timely manner, according to Borgatti and Cross 2003). During an audit engagement it is the senior who is most accessible to the junior.

Our study is related to the research on error management climate, but rather than surveying or manipulating audit juniors' perceptions of a firm's overall error management climate, we focus on the explicit demonstration of a high or open error management climate in an on-the-job setting, namely auditor seniors' modeling fallibility. In the organizational literature, Schneider, González-Romá, Ostroff, and West (2017) identify leader behavior as an important antecedent of organizational climate. Audit juniors look upon audit seniors as role models and as a direct performance supervisors. While juniors learn to adapt to and grow in the firm, because juniors spend a substantial amount of their time working side by side with seniors at the client's premises rather than at their own firm offices, seniors acknowledging and discussing their own errors is a strong signal in advance that the firm and in particular, the specific work setting (i.e., the work team) has a high or open climate. As a result, juniors' observations and expectations regarding superiors' responses to the admission of their own errors have a significant impact on juniors' willingness to be forthcoming with respect to their own errors. The study of Stefaniak and Robertson (2010) supports our focus on the modeling role of seniors in audit juniors' learning and adaptation process. Stefaniak and Robertson (2010, 48), using an experimental design and upper-level undergraduate and graduate accounting students, found evidence suggesting that subordinates were significantly more likely to admit errors if superiors' previous responses were "to turn the incident into a positive, constructive experience" rather than a "negative, humiliating experience."

The Hypotheses and the Model

Drawing on the organizational literature on learning from errors (e.g., Edmondson 1996, 1999, Frese and Keith 2015; Rybowiak, Garst, Frese, and Batinic 1999; Ohlsson 1996; Zhao 2011; Grohnert et al. 2018) and on the accounting literature (e.g., Stefaniak and Robertson 2010; Gronewold and Donle 2011; Gronewold et al. 2013; Seckler et al. 2017), the paper proposes a model that focuses on the relationship between the audit senior's modeling fallibility and audit juniors' responses to self-discovered errors, and tests the mediating effect of juniors' perceived error strain and error-related self-efficacy.

Audit Senior Modeling Fallibility

A direct positive association is expected between audit senior modeling fallibility and audit juniors' responses to self-discovered error, which is defined as the extent to which junior auditors engage in effortful activities for the purpose of error correction and/or error prevention. Drawing on research on individual error coping orientations (Rybowiak et al. 1999), we consider two types of error coping responses: thinking about errors and error communication. Thinking about errors refers to employees engaging in reflection and analysis of errors on one's own and thus is a solo or intra-personal activity. Error communication involves other members in a team or organization (e.g., discussing errors with colleagues and seeking information for fixing errors) and thus is an inter-personal activity.

Drawing on social modeling and learning theory (Bandura 1977a, 1977b, 1982), we posit that audit seniors' behaviors, as a way of social modeling, play a particularly salient role in guiding and influencing audit juniors' on-the-job behaviors. Juniors are likely to attend to each other's actions and responses, but it is reasonable to expect that they would pay particular attention to the words and deeds of the senior, because he or she is a role model and a mentor in the junior's learning and adapting process. Also, to establish a good reputation and to enhance their career advancement prospects in the firm, juniors have every reason to follow the example set by the senior who is their performance supervisor and rater, and who directly and closely interacts with juniors on a daily basis. When seniors openly and publicly share information about their own error-making and error-handling experiences, it sends a strong signal to juniors that the audit firm has an open error management climate, which encourages and expects problem-focused coping responses, either as an intra- or inter-personal activity. In other words, seniors who model fallibility set a good example for juniors; as a result, juniors will follow suit and feel motivated to engage in constructive error coping activities, even when it involves taking interpersonal risks and disclosing information about their own errors to other members. Therefore, audit senior modeling fallibility helps juniors take a learning-oriented perspective to their own errors and promotes constructive error coping responses, including both thinking about errors and error communication. To summarize, the first set of hypotheses, stated in alternate form, is:

H1a: Audit senior modeling fallibility is positively associated with audit juniors' thinking about errors.

H1b: Audit senior modeling fallibility is positively associated with audit juniors' error communication.

Error Strain

Error strain is the first of the two mediators proposed in the model. Error strain is defined as negative emotions, such as fear, anxiety, stress, and embarrassment, due to errors committed at work (Rybowiak et al. 1999). Research has suggested that managers' expectations, attitudes, and beliefs about errors and learning from errors play a salient role in affecting employees' emotions and learning (e.g., Edmondson 1996, 1999; Zhao 2011; Gronewold and Donle 2011; Gronewold et al. 2013). In this context, error strain is related to the senior's role as the assessor of the performance of the junior. In such evaluative situations, juniors can be expected to strive to project an image of competence to the senior as the primary evaluator (Jones and Pittman 1982; Palmer and Welker 1994). Admitting to an error could harm that image of competence, giving rise to error strain. The senior, by admitting having committed errors in the past, would be sending a very strong signal to the junior that acknowledging one's own errors and using the experience of having made errors as a learning tool is a positive thing. By acknowledging their own fallibility, seniors show acceptance of juniors' errors and failures as an inevitable part of work and frame errors as opportunities to learn and improve performance instead of as embarrassing events (Edmondson 2012). If leaders clearly mark out the boundary between what is acceptable and what is not, by explaining and modeling the desired responses to errors, unnecessary stress perceived by members can be relieved (Zhao 2011; Zhao and Olivera 2006). Therefore, seniors' modeling fallibility is expected to reduce the level of error strain. At the same time, error strain is expected to be negatively associated with audit juniors' constructive responses to self-discovered errors. Both intra- and inter-personal coping responses take time and efforts. Error strain inhibits constructive coping activities because error strain distracts limited cognitive resources from task-related thinking and behavior to task-irrelevant emotion coping activities (Frese and Keith 2015; Rybowiak et al. 1999). As a result, error strain elicits dysfunctional reactions to errors (e.g., blaming errors on others, justifying errors, etc.) and dampens juniors' willingness to be forthcoming regarding self-discovered errors (Rybowiak et al. 1999). Thus, the path through error strain would be the multiplicand of two negatives, i.e., it would positively influence juniors' responses to errors. To conclude, we expect that the indirect effect of seniors' modeling fallibility will be to promote audit juniors' intra- and inter-personal error coping responses by reducing error strain:

H2a: Error strain positively mediates the association between audit seniors' modeling fallibility and audit juniors' thinking about errors.

H2b: Error strain positively mediates the association between audit seniors' modeling fallibility and audit juniors' error communication.

Error-Related Self-Efficacy

Error-related self-efficacy relates to the senior's position as role model and mentor for the junior. Self-efficacy can be defined as the belief in one's own ability to successfully fulfill a task (Bandura 1977a), and error-related self-efficacy refers to the confidence an individual has in her or his ability to cope with errors, including unexpected problems caused by errors.

Social modeling, serving as a vicarious experience, is one of the key sources that influence self-efficacy beliefs (Bandura 2012, 1997, 1977a). A team leader's modeling behaviors often catch much attention of team members and influence team

members' self-perceptions (Yukl and Heaton 2002). Audit seniors' modeling fallibility can promote juniors' error-related self-efficacy for several reasons. First, constructive framing of error situations by the seniors would help protect juniors' confidence and facilitate their resilience when confronting errors and failures (Edmondson 1999, 2012). Second, by sharing lessons learned from their own errors, seniors directly contribute to building juniors' confidence concerning error-handling by equipping them with needed knowledge and skills. Third, seniors who model fallibility are providing a role model. Juniors will notice and may imitate such modeling behavior when they run into similar error situations (Edmondson 1999). As a consequence, juniors tend to strongly believe in their ability to handle errors and the related problems, which, in turn, enhances the likelihood of juniors' engaging in either intra- or inter-person error coping activities. Based on the above, we hypothesize that seniors' modeling fallibility will have a positive indirect effect on audit juniors' thinking about errors and error communication through enhancing error-related self-efficacy:

H3a: Error-related self-efficacy positively mediates the association between audit seniors' modeling fallibility and audit juniors' thinking about errors.

H3b: Error-related self-efficacy positively mediates the association between audit seniors' modeling fallibility and audit juniors' error communication.

The model, illustrating the hypothesized direct and indirect paths, is shown in Figure 1.

III. METHOD

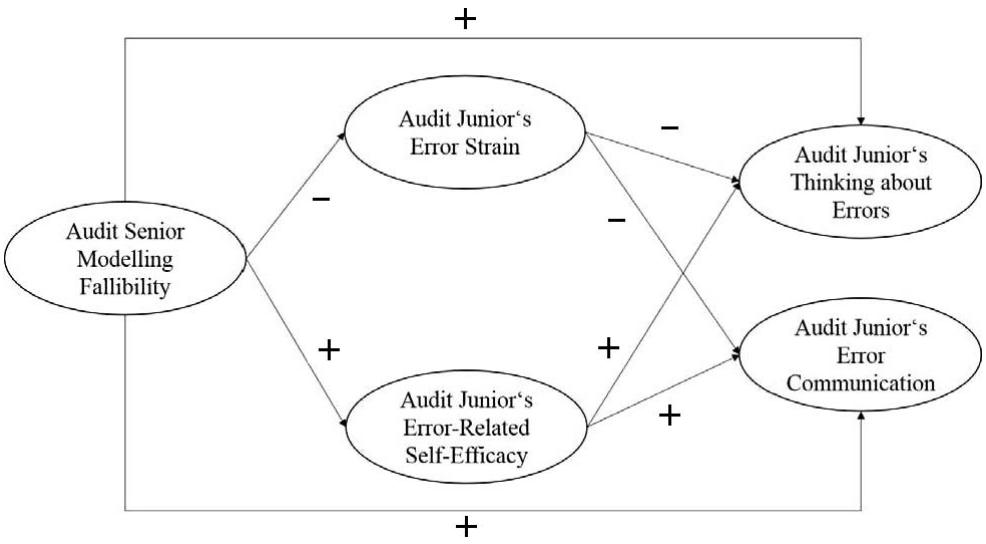
Data Collection and Sample

The participants were audit juniors from the western Canadian offices of two of the Big 4 public accounting firms (hereafter referred to as Alpha and Beta). We first contacted the audit partner of each office to ask for permission and assistance in enlisting the participation of their junior staff. With the partner's permission and assistance, an email invitation was sent to all the juniors in these firm offices. Those who volunteered to participate in the study, and who met the criteria for inclusion—the audit team at the client's premises consisted of at least three members, including themselves, and worked together for at least three days—were asked to complete an online survey anonymously.[1] At the beginning of the survey, participants were asked to reflect on their most recent audit teamwork experience where they were concerned that they made an error at work.[2] They were also asked for information on how long they worked on the audit team and the team size ("How many members were there in this team, excluding the senior?"). Data were collected at Firm Beta first. We sent invitations to 184 audit juniors and received 135 responses. We examined the 135 responses and eliminated those that contained incomplete responses, had the same answer for all the scale items, or had contradictory answers to the first and the third Senior Modeling Fallibility items (because the first item "The senior preferred to keep his or her errors to him/herself" was reverse coded). This resulted in 115 valid responses. More data were collected at Firm Alpha about two months later. We sent out 201 invitations to the firm's audit juniors and received 185 responses. After data cleaning as we did for data collected from Firm Beta, there were 151 valid responses from Firm Alpha. Because some of the recipients would not have satisfied the criteria regarding number of team members and number of days, and would have self-selected out of responding to the questionnaire, it is reasonable to say that the overall response rate of eligible respondents was at least 69 percent. Participants' average work experience is 1.76 years (SD = 1.10), average team tenure is 28.67 days (SD = 58.22), and 56.7 percent of the participants are male.

We tested for a potential response bias by checking whether the means and the variance differ between early respondents (i.e., the earliest 25 percent of respondents) and late respondents (i.e., the latest 25 percent of respondents) (Fulton 2018). We found no significant differences in the mean and in the standard deviation between early and late respondents from firm Alpha. Regarding firm Beta, we found that late respondents have a higher mean for audit senior modeling fallibility than early respondents (mean difference = 0.63; $p = 0.03$), and that the standard deviation differed between early and late respondents with regard to error-related self-efficacy (SD difference = 0.55; $p < 0.001$) and thinking about errors (SD difference = 0.69; $p = 0.03$). In order to rule out the possibility that the differences between early and late respondents from firm Beta influence our findings, we tested our hypotheses using data from firm Alpha only (where we found no evidence indicating bias). We found that all the results remained qualitatively the same in the sub-sample of firm Alpha. Therefore, we conclude that our findings are not significantly influenced by response bias and combined both firms' data in our hypothesis testing.

[1] We chose three members and three days to represent a minimum to establish a team identity.
[2] The survey was reviewed and approved by the Office of Research Services of Simon Fraser University.

FIGURE 1
Hypothesized Model



+ and − indicate the hypothesized relationship between the constructs.

Measures

Participants rated all items on seven-point scales ranging from "strongly disagree" (1) to "strongly agree" (7).[3] Appendix A presents the scales used to elicit participants' responses to the statements concerning each of the constructs of Audit Senior Modeling Fallibility (MF), Error-Related Self-Efficacy (ESE), Thinking about Errors (TE), Error Communication (EC), and Error Strain (ES).

Audit Senior Modeling Fallibility

Because the construct of audit senior modeling fallibility had not been empirically studied in previous research, we developed a new scale for the construct. We followed the development process described in previous studies (e.g., Hinkin 1995; MacKenzie, P. Podsakoff, and N. Podsakoff 2011; Shepherd, Patzelt, and Wolfe 2011): the first step of the scale development was conceptualization. That is, we defined the construct and its conceptual domain (MacKenzie et al. 2011). We conducted an extensive review of the literature to analyze how "leader modeling fallibility" has been described and defined in prior studies. We then defined the construct's conceptual domain (entity = person; general property = perception) (MacKenzie et al. 2011). In the second step, we developed a set of nine items that reflect the construct. The items were based on our definition of the construct and prior academic work that referred to the construct. In the third step, the content validity of the items was assessed. After we conducted a first critical check of the items, we distributed the items to experts in the field (one professor in accounting, two professors in education with a focus on learning from errors, two partners, and two managers from two accounting firms) who also checked the fit of the items to the theoretical definition of the construct. Based on their suggestions, two items were eliminated and some of the remaining items were rephrased. The last step was a pilot test using seven employees randomly drawn from the targeted sample (juniors from firm Beta) to identify any potential problems with the scale, which resulted in minor modifications in wording. For the pilot test, we sent these employees a web link to the full questionnaire. Later on, we spoke with some of the employees and the senior partners of the firm (by showing them a hard copy of the full questionnaire) to get their reactions to the questionnaire, particularly the newly developed scale of senior modeling fallibility. We collected information around issues such as the length of the questionnaire, the clarity of instructions, and whether they found anything difficult to understand, and made modifications accordingly. We took care and made sure that the seven pilot testers did not participate in the main study by dropping their email addresses from the email list when we sent out our main study invitation.

[3] For all scales adopted from prior research, items were rephrased to better fit this research context (e.g., instead of using the term "team leader," the questionnaire asked participants about "the senior"). We decided against rewording some of the positively worded items into negatively worded items, because this has been shown to negatively affect the reliability of the scale (Roszkowski and Soven 2010).

The final measure we used in our main study consisted of seven items. Sample items of the scale are: "When the senior made an error, he/she would share it with us so that we did not make the same mistake" and "When the senior made a mistake, he/she openly talked about it." The reliability of the scale was $\alpha = 0.92$.[4]

Error Strain

We used five items from the scale developed by Rybowiak et al. (1999) to measure error strain. Example items are: "I found it stressful when I erred" and "I was often afraid of making mistakes." The reliability of the scale was $\alpha = 0.86$. One item ("If I made a mistake at work, I 'lost my cool' and became angry") was dropped from further data analysis due to its low correlation with the four other items of the scale ($r \leq |0.25|$) and its low factor loading (0.29).

Error-Related Self-Efficacy

We assessed error-related self-efficacy with six items, which were based on a scale of general self-efficacy developed by Schwarzer, Bäßler, Kwiatek, Schröder, and Zhang (1997). The measure was preceded with the preface "In spite of the mistakes I made at work in this team." Example items are: "I could solve most problems if I invested the necessary effort" and "I could usually find the solutions to the problems caused by my errors." The reliability of the scale was $\alpha = 0.85$.

Thinking about Errors

We measure the first dependent variable "thinking about errors" using two items from the scale adapted from Rybowiak et al. (1999). An example is: "After I made a mistake, I thought about how it had come about." The reliability of the scale was $\alpha = 0.71$.

Error Communication

We measure the second dependent variable "error communication" using the two items from the scale adapted from Rybowiak et al. (1999). An example item is: "When I had done something wrong, I asked others how I should do it better." Also, we developed a new third item to measure error communication: "I would discuss my mistakes with others on this team when I tried to draw lessons from these mistakes" by referring to the content of Rybowiak et al.'s (1999) "learning from errors" scale because broadly speaking, learning from errors is also one of the constructive inter-personal responses of audit juniors in a team setting (not just in theory, but also based on our personal observation and communication with our contacts in the participating accounting firms). The reliability of the scale was $\alpha = 0.66$.

IV. RESULTS

Descriptive Statistics

Table 1 shows the descriptive statistics, reliability coefficients, and correlations of the variables.

Confirmation of Measurement Model

We conducted Confirmatory Factor Analysis (CFA) in MPlus 7.4 to verify our hypothesized factor structure. In our measurement model, all items loaded on the respective latent construct and all latent constructs were free to correlate with each other. We used maximum likelihood estimation with robust standard errors to obtain standard errors and Chi-square tests that are robust to violations of the assumption of normality. We tested the fit of the five-factor model (audit senior modeling fallibility, error-related self-efficacy, error strain, thinking about errors, and error communication). The model fit to the data was mediocre ($\chi^2 = 490.50$; $p < 0.001$; df = 199; comparative fit index [CFI] = 0.88; Tucker-Lewis index [TLI] = 0.86; standardized root mean square residual [SRMR] = 0.06; root mean square error of approximation [RMSEA] = 0.07). All items loaded significantly on the intended latent constructs ($p < 0.001$). We tested the fit of this five-factor model against the fit of four alternative models (see Table 2): a four-factor model in which the mediating variables (error strain and error-related self-efficacy) are combined into one factor (Model 2); a four-factor model in which the dependent variables (thinking about errors and error communication) are combined into one factor (Model 3); a three-factor model, in which audit senior modeling fallibility is combined with the mediators (Model 4), and a one-factor model in which all factors are combined (Model 5). A Chi-square difference test ($p < 0.001$) and a comparative fit index (CFI) difference test (Meade, Johnson, and Braddy 2008) showed that the hypothesized five-factor model (Model 1) provided a better fit than the alternative models. Furthermore, we

[4] The reliability of all scales was calculated using the data from the main survey study and not from the pre-test.

TABLE 1

Descriptive Statistics and Correlations

Variable	Mean	SD	1	2	3	4	5
1. Thinking about Errors	5.60	0.83	(0.71)				
2. Error Communication	5.60	0.84	0.49	(0.66)			
3. Audit Senior Modeling Fallibility	4.66	1.14	0.28**	0.30***	(0.91)		
4. Error Strain	4.98	1.21	0.01	0.06	−0.24***	(0.89)	
5. Error-Related Self-Efficacy	5.42	0.78	0.43***	0.38***	0.37***	−0.25*	(0.76)

***, **, * Denote $p \leq 0.001$, $p \leq 0.01$, and $p \leq 0.05$, respectively, two-tailed tests.
$n = 266$. Coefficient Alphas are in parentheses on the diagonal.

performed a visual inspection of the correlation matrix for all items, which showed that items that measure the same underlying construct correlate highly with each other and have low cross-correlations with items that measure other constructs. This approach provides further evidence for the discriminant validity of our constructs.

We collected all data on each questionnaire from a single informant (that is, all the data for the predictor, mediator, and dependent variables were collected from the same respondent). This approach was inevitable, because our study focuses on the relationship between employees' perceptions (e.g., perceived leader modeling fallibility) and their responses to errors (i.e., thinking about errors and error communication), which is often difficult to observe for an outsider (e.g., audit senior). Yet, this approach may cause problems of common method bias. We followed recommendations in the literature (P. Podsakoff, MacKenzie, and N. Podsakoff 2012) and took several steps before and during the study to reduce common method bias: first, we sought to eliminate ambiguous items and reduce social desirability bias in item wording by carefully analyzing each item and by pilot testing the questionnaire with audit juniors. Second, to avoid social desirability bias, we used a self-administered survey and we guaranteed participants that their responses would be treated confidentially and that only aggregated data would be presented; and we told participants that there were no right or wrong answers to the questions.

Although these approaches can help reduce the effect of common method bias, they cannot entirely solve the problem. Therefore, we also performed statistical tests to analyze the extent of common method bias. First, we performed Harman's (1976) single-factor test. The unrotated principal-component factor analysis extracted five factors with eigenvalues greater than 1; the first factor accounted only for 30.9 percent of the variance. We interpret the absence of a single factor that accounts for most of the variance as evidence that common method variance poses no serious problem. Second, we followed P. Podsakoff, MacKenzie, Lee, and N. Podsakoff (2003) and controlled for the influence of an unmeasured latent method factor. We conducted a CFA in MPlus 7.4 and allowed all items to load on their respective construct and on a latent method factor. The resulting model ($\chi^2 = 488.62$; $p < 0.001$; $df = 198$; $CFI = 0.88$; $TLI = 0.86$; $SRMR = 0.059$; $RMSEA = 0.074$) did not provide a better fit than the more parsimonious model, in which all items loaded only on their respective constructs (χ^2 difference [$df = 1$] $= 1.88$; $p > 0.05$). Overall, the findings indicate that common method bias is not a problem in this study.

TABLE 2

Comparison of Alternative Models

	χ^2	CFI	TLI	SRMR	RMSEA	df
Model 1	490.50	0.879	0.860	0.060	0.074	199
Model 2	855.35	0.728	0.686	0.099	0.111	200
Model 3	507.67	0.873	0.853	0.061	0.076	200
Model 4	1211.09	0.582	0.522	0.136	0.137	202
Model 5	1433.35	0.493	0.439	0.149	0.148	209

Model 1: Hypothesized five-factor model (audit senior modeling fallibility, error strain, error-related self-efficacy, thinking about errors, and error communication).
Model 2: Alternative four-factor model (error strain and error-related self-efficacy are combined into one factor).
Model 3: Alternative four-factor model (thinking about errors and error communication are combined into one factor).
Model 4: Alternative three-factor model (audit senior modeling fallibility is combined with error strain and error-related self-efficacy).
Model 5: Alternative one-factor model (all latent constructs load on the same factor).

TABLE 3

Direct, Indirect and Total Effects

Effects of Audit Seniors' Modeling Fallibility on Audit Juniors' Thinking about Errors		Effects of Audit Seniors' Modeling Fallibility on Audit Juniors' Communication about Errors	
Indirect effect through...		Indirect effect through...	
Error Strain	−0.05*	Error Strain	−0.07*
Error-Related Self-Efficacy	0.23***	Error-Related Self-Efficacy	0.20**
Direct Effect	0.15†	Direct Effect	0.26***
Total Effect	0.33***	Total Effect	0.39***

***, **, * Denote $p \leq 0.001$, $p \leq 0.01$, and $p \leq 0.05$, respectively, two-tailed tests.
† $p \leq 0.10$.
n = 266. Standardized coefficients.

Structural Model

We tested our research model with structural equation modeling using MPlus 7.4. The full model included the indirect effect of audit senior modeling fallibility via error strain and via error-related self-efficacy, and a direct path from audit senior modeling fallibility. The model was a mediocre but minimally acceptable fit to the data ($\chi^2 = 580.20$; $p < 0.001$; df = 200; CFI = 0.87; TLI = 0.86; SRMR = 0.067; RMSEA = 0.085).[5] We tested whether the structural parameters differ between audit juniors working for firm Alpha and firm Beta. We found that a model in which all parameters are free to vary provides a slightly better fit than a model in which all parameters are constrained to equality across firms (χ^2difference [df 9] = 19.14; p = 0.024). To check whether the differences in the strength of the relationship between audit juniors in firm Alpha and firm Beta affect our results, we ran separate analyses for each firm. We found that the findings were similar for both companies except for H3b, which was significant for firm Alpha (indirect effect = −0.08; p = 0.017) but insignificant for firm Beta (indirect effect = −0.00; p = 0.892). Because the larger sample size leads to a greater statistical power to detect an effect, we combined data from both firms in our model.

We tested the direct effect of audit senior's modeling fallibility, and the two hypothesized mediating effects of audit seniors' modeling fallibility in a single model. We also ran a model that included two control variables (gender and work experience). We controlled for gender, because females have been found to react differently to leader modeling behavior than males (Owens and Hekman 2016). Our decision to control for work experience was based on research that showed that work experience influences learning from errors (e.g., Carmeli and Gittell 2009; Edmondson 1999), because team members with little work experience might feel more insecure and thus react to errors differently than members with more work experience. None of the findings with regard to the hypotheses were affected by the inclusion of the control variables and thus they were not included in the subsequent analyses. Table 3 summarizes the results of the structural model and decomposes the effects into indirect and direct effects. Figure 2 presents the results graphically and shows the coefficient values of the intermediate paths through the hypothesized mediating variables.

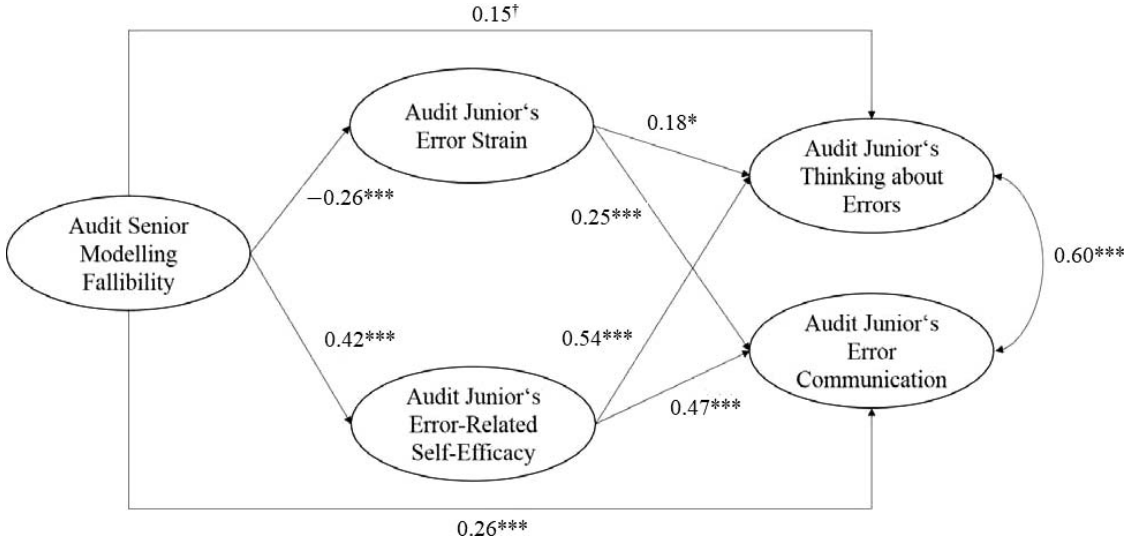
Tests of Hypotheses

Hypotheses H1a and H1b

H1a predicted that senior leader modeling fallibility is positively associated with juniors' thinking about errors. As shown in Table 3 and in Figure 2, the total effect of senior modeling fallibility on juniors' thinking about errors is positive and significant ($\beta = 0.33$; $p < 0.001$). H1b predicted that senior modeling fallibility is positively associated with juniors' communication about errors. As shown in Table 3 and in Figure 2, the total effect of senior modeling fallibility on juniors' communication about errors is positive and significant ($\beta = 0.39$; $p < 0.001$). Therefore, H1a and H1b are supported.

[5] A model with a good fit has a non-significant Chi-square, a CFI and TLI of 0.90 (or for well-fitting models, 0.95 and above) with a RMSEA of 0.08 (with a well-fitting model of 0.05 or below). Hence, the model's fit is mediocre but acceptable.

FIGURE 2
Results of the Hypothesized Model



***, * Denote $p \leq 0.001$ and $p \leq 0.05$, respectively, two-tailed tests.
† $p \leq 0.10$.
Standardized coefficients.

Hypotheses H2a and H2b

To test the significance of the indirect effects (H2a, H2b, H3a, and H3b), we used the bias-corrected bootstrap confidence interval (CI) method with 1,000 random draws (MacKinnon, Lockwood, and Williams 2004) by employing the MPlus command provided by Lau and Cheung (2012). We interpreted an indirect effect to be statistically significant if the 95 percent confidence interval (CI) around the indirect effect excluded zero.

H2a predicted that audit seniors' modeling fallibility is positively associated with audit juniors' thinking about errors through error strain. The association between audit senior modeling fallibility and error strain is negative and significant ($\beta = -0.26$; $p < 0.001$), consistent with the idea that audit senior modeling fallibility reduces the level of error strain in team members. By acknowledging their own fallibility, seniors signal acceptance of errors and frame errors as opportunities to learn instead of embarrassing events. However, the effect of error strain on juniors' thinking about errors is positive and significant ($\beta = 0.18$; $p = 0.022$). As a result, the overall indirect effect is negative ($\beta = -0.05$), and the 95 percent CI excluded 0 (CI: −0.10; −0.01); thus H2a is not supported, because we expected a positive indirect effect. This unexpected finding is discussed further in the Discussion section.

H2b predicted that audit seniors' modeling fallibility is positively associated with audit juniors' communication about errors through error strain. The association between audit senior modeling fallibility and error strain is negative and significant ($\beta = -0.26$; $p < 0.001$), and the relationship between error strain and juniors' communication about errors is positive and significant ($\beta = 0.25$; $p = 0.001$). The overall indirect effect is negative ($\beta = -0.07$), and the 95 percent CI excluded 0 (CI: −0.14; −0.02). Therefore, H2b is not supported, because we expected a positive indirect effect. This unexpected result is also discussed further in the Discussion section.

Hypotheses H3a and H3b

H3a predicted that audit seniors' modeling fallibility is positively associated with juniors' thinking about errors through error-related self-efficacy. The link between audit senior modeling fallibility and error-related self-efficacy was 0.42 ($p < 0.001$) and the link between error-related self-efficacy and juniors' thinking about errors was 0.54 ($p < 0.001$). The overall indirect effect was 0.23 and the 95 percent CI excluded 0 (CI: 0.14; 0.32). Therefore, H3a is supported.

H3b posited that audit seniors' modeling fallibility is positively associated with juniors' communication about errors through error-related self-efficacy. The relationship between senior modeling fallibility and error-related self-efficacy was 0.42 ($p < 0.001$) and the association between error-related self-efficacy and juniors' communication about errors was 0.47

($p < 0.001$). The overall indirect effect was 0.20 and the 95 percent CI excluded 0 (CI: 0.11; 0.30). Therefore, H3b is supported.

V. DISCUSSION

Theoretical and Practical Implications

Based on the analysis of data collected from audit juniors employed in the Canadian offices of two large international accounting firms, our results indicate that leading by example, audit seniors can effectively motivate junior audit team members to respond constructively to self-discovered errors. As revealed in our data analysis, audit seniors' modeling fallibility also reduces error strain, and enhances members' confidence, which all contribute to building a positive error management climate (e.g., Stefaniak and Robertson 2010, Gold et al. 2014). This finding further underlines the importance of leader behavior for the creation of an open error management climate within the organization (Schneider et al. 2017).

Our study showed that even after taking into account the mediation through error-related self-efficacy and error strain, there were still direct positive associations between audit seniors' modeling fallibility and juniors' responses. This finding supports the social learning theory of social modeling (e.g., Bandura 1977b). Through modeling fallibility, audit team leaders directly teach members what it means to properly respond to one's own errors in the delivery of responsible performance.

As hypothesized, audit senior modeling fallibility was positively associated with audit juniors' thinking about errors and error communication through the mediating variable of error-related self-efficacy. By providing an example of having committed an error and dealing with the consequences, seniors enhance the junior's confidence in their own ability to handle similar situations. At that point in their career, past errors that seniors could have made and might discuss in their modeling fallibility would essentially be the kinds of errors that juniors might be making now (seniors were juniors not so long ago). The modeling of committing and dealing with errors that may well be the same (types of) errors that a junior is concerned about would directly "teach" the juniors how to resolve that difficulty.

An unexpected outcome is that although we found that the relationship between audit senior modeling fallibility and juniors' responses to errors is mediated through error strain, the indirect effects were negative, not positive as hypothesized. That is, although senior modeling fallibility was negatively related to error strain, error strain was positively (the opposite of the hypothesized negative link) associated with juniors' thinking about errors and error communication. This finding is interesting and suggests that error strain may actually serve as an alert, and motivates juniors to engage in constructive error coping responses for the purpose of error correction or prevention. Although unexpected, this stimulating role of error strain is consistent with findings from recent management research (e.g., Zhao 2011) suggesting that negative emotions elicited by errors can actually motivate functional error coping responses when the level of these negative emotions is not high (mean of error strain is 4.98, SD = 1.21 in our study). This finding also reminds us that while senior modeling fallibility creates a less stressful task environment for juniors, you do not want to make juniors feel so "worry-free" that they will lose the motivation to engage in both intra- and inter-personal activities to get their self-discovered errors corrected or fixed (Zhao, Seifried, and Sieweke 2018). While it is good to relieve unnecessary stress caused by errors, it is equally important to hold employees accountable for their performance (Edmondson 2012).

It is a common belief in the error management research in general (e.g., Frese and Keith 2015; van Dyck et al. 2005; Zhao et al. 2018), and in the context of professional accounting firms (e.g., Gronewold and Donle 2011; Gronewold et al. 2013), that an environment and a mind-set of acceptance of errors facilitates effective handling of self-discovered errors. Seckler et al. (2017) suggested several managerial practices, such as encouraging shared resilient practices (e.g., cool-headed error-handling), that could foster such norms and practices. Audit senior modeling fallibility as discussed and measured in this study is another such practice. By modeling fallibility, audit seniors, and perhaps more senior leaders can encourage acceptance of errors as part of work, reflecting on and analysis of errors by one's own, sharing error knowledge in the team, helping each other in error situations, and communicating honestly about errors to facilitate continuous performance improvement and to enhance audit quality.

Limitations and Suggestions for Future Research

Given the fact that we collected data from audit juniors working in large accounting firms in Canada, a limitation of our study is the generalizability of the findings. Future research is needed to see whether the tested linkages apply to other groups of auditors (e.g., seniors or middle-level managers), across firms (e.g., smaller accounting firms), and in other cultural contexts (e.g., across countries). Another limitation of the study is that the model fit is relatively poor. This suggests that the model specification can be improved. Further research needs to be done on factors that were potentially omitted from the model.

Another potential limitation of this study is that due to the concerns of the participating firms regarding confidentiality safeguards for the respondents we were not able to collect the data in such a way as to allow us to identify juniors coming from

the same team. Therefore, we could not aggregate individual-level data to calculate a team level measure for team leader modeling fallibility, which would offer interesting insights into the presence of a modeling fallibility climate at the team level.

Moreover, our measures of the dependent variables, thinking about errors and error communication, are based on self-reported data. Although we found no evidence of common method bias, a fruitful avenue for future research may be to employ designs that may result in stronger evidence—for instance, researchers directly observing employee behavior such as error communication, instead of relying on self-reported data.

Furthermore, we need to emphasize that our findings should be interpreted with caution for at least two reasons: First, we used a shortened version of the thinking about errors scale and a shortened and modified version of error communication scale from Rybowiak et al (1999), which may affect the reliability and validity of the scales. Second, the fit statistics of our SEM were mediocre, which indicates some misfit between the theoretical model and our empirical data. This mediocre fit provides opportunities for future research, as researchers may seek to modify our theoretical model to increase its fit with the empirical data.

Finally, due to limitations regarding length and time necessary to complete our online survey (as part of the agreement with the participating firms), we were not able to include control variables such as managers' and partners' views about errors and error consequences, as done in previous studies (e.g., Gold et al. 2014; Stefaniak and Robertson 2010). We encourage future research to properly assess the impact of such variables to help us fully understand the role of managers and partners in juniors' error coping responses. Better yet, future studies should also consider controlling error-related characteristics such as the type and the number of errors committed by the respondents to further refine our understanding of the phenomena examined in this study.

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APPENDIX A

Scales

Audit Senior Modeling Fallibility (MF)

Please read carefully each of the following statements and indicate the extent to which you agree or disagree that the statement describes **the senior in this team** by selecting the number that best corresponds with your response.

	Strongly Disagree			**Neither Agree Nor Disagree**			**Strongly Agree**
The senior preferred to keep his or her errors to him/herself (MF_1)	1	2	3	4	5	6	7
The senior believed that the open discussion of errors was a part of work in our team (MF_2)	1	2	3	4	5	6	7
When the senior made a mistake, he/she openly talked about it (MF_3)	1	2	3	4	5	6	7
When the senior made an error, he/she would share it with us so that we did not make the same mistake (MF_4)	1	2	3	4	5	6	7
When the senior could not rectify an error by him/herself, he/she communicated with us to find the reason and solution together (MF_5)	1	2	3	4	5	6	7
The senior asked for input of us when trying to fix errors (MF_6)	1	2	3	4	5	6	7
The senior valued our opinions equally when trying to fix errors (MF_7)	1	2	3	4	5	6	7

Error-Related Self-Efficacy (ESE)

Please read carefully each of the following statements and indicate the extent to which you agree or disagree that the statement describes **you in this team** by selecting the number that best corresponds with your response. All the items listed below begin with the following statement "**In spite of errors I made at work in this team,** . . ."

	Strongly Disagree			**Neither Agree Nor Disagree**			**Strongly Agree**
I could still manage to complete all the assigned tasks if I tried hard enough (ESE_1)	1	2	3	4	5	6	7
It was easy for me to stick to my aims and accomplish my goals (ESE_2)	1	2	3	4	5	6	7
I was confident that I could deal efficiently with the problems caused by my unexpected errors (ESE_3)	1	2	3	4	5	6	7
I could solve most problems if I invested the necessary effort (ESE_4)	1	2	3	4	5	6	7
I could usually find the solutions to the problems caused by my errors (ESE_5)	1	2	3	4	5	6	7
No matter what errors came my way, I was usually able to handle them (ESE_6)	1	2	3	4	5	6	7

Thinking about Errors (TE), Error Communication (EC), and Error Strain (ES)

Please read each of the following statements carefully and indicate the extent to which you agree or disagree that the statement describes **you in this team** by selecting the number that best corresponds with your response.

	Strongly Disagree			**Neither Agree Nor Disagree**			**Strongly Agree**
After I made a mistake, I thought about how it had come about (TE_1)	1	2	3	4	5	6	7
After a mistake had happened, I thought long and hard about how to correct it (TE_2)	1	2	3	4	5	6	7
I would discuss my mistakes with others on this team when I tried to draw lessons from these mistakes (EC_1)	1	2	3	4	5	6	7
If I could not rectify an error by myself, I turned to my senior or colleagues on this team (EC_2)	1	2	3	4	5	6	7
When I had done something wrong, I asked others how I should do it better (EC_3)	1	2	3	4	5	6	7
I found it stressful when I erred (ES_1)	1	2	3	4	5	6	7
I was often afraid of making mistakes (ES_2)	1	2	3	4	5	6	7
I felt embarrassed when I made an error (ES_3)	1	2	3	4	5	6	7
If I made a mistake at work, I 'lost my cool' and became angry (ES_4)	1	2	3	4	5	6	7
While working I was concerned that I could do something wrong (ES_5)	1	2	3	4	5	6	7