Examining the cross-level relationship between shared leadership and learning in teams: Evidence from China ☆

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ABSTRACT

The current study extends the literature on shared leadership by exploring the questions of *whether*, *how*, and *when* shared leadership makes an impact on team and individual learning behaviors. Specifically, the current research proposed that shared leadership has a positive impact on both team and individual learning and this impact was realized through the mediating role of team psychological safety. Furthermore, the study introduces job variety as a potential moderator in the relationships between shared leadership on team and individual learning behaviors through team psychological safety, such that the indirect effects are more positive when team members perceived high job variety. Using 263 members from 50 teams in China, the hypotheses were largely supported. Theoretical contributions, practical implications and future research directions are discussed.

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1. Introduction

Leadership has long been considered as one of the key contributors for organizational effectiveness (Yukl, 2012). Work teams are widely used in organizations (Hackman, 2002) and team researchers have generally suggested that team leadership plays a major role in shaping both individual members' attitudes and behaviors and the overall team's climate and actions (see Kozlowski, Gully, Salas, & Cannon-Bowers, 1996; Morgeson, DeRue, & Karam, 2010; Zaccaro, Rittman, & Marks, 2001 for reviews). To date, prior research has primarily focused on the role of formally assigned or vertical leaders in teams, while giving much less attention to an important form of leadership—shared leadership. Shared leadership is an emergent leadership style resulting from the distribution of leadership influence across multiple team members (Bowers & Seashore, 1966; House & Aditya, 1997). As Carson, Tesluk, and Marrone (2007) noted, shared leadership can be conceptualized along a continuum with the degree from low to high. It means that shared leadership may exist in every team but at different levels, rather than a rigid either–or category. The omission of shared leadership in teams is unfortunate due to the increasing demands of collectivistic leadership and the growing emphasis on cooperation and coordination within teams (Day, Gronn, & Salas, 2004; Friedrich, Vessey, Schuelke, Ruark, & Mumford, 2009; Hackman, 2002; Hiller, Day, & Vance, 2006; Yammarino, Salas, Serban, Shirreffs, & Shuffler, 2012). Indeed, as Yammarino et al. (2012) noted, "these new collectivistic leadership approaches are an important development for both science and practice" (p. 383). A handful of studies have confirmed the important role of shared leadership in teams (Avolio, Jung, Murry,

& Sivasubramaniam, 1996; Carson et al., 2007; Mehra, Smith, Dixon, & Robertson, 2006; Sivasubramaniam, Murry, Avolio, & Jung, 2002) and some even found that shared leadership was more influential than traditional vertical leadership for team performance (Bowers & Seashore, 1966; Pearce & Sims, 2002).

Extending this line of research, the current study seeks to enrich our understanding of how shared leadership influences not only the overall team's behavioral outcomes but also individual members' perceptions, interactions, and learning within the team. While empirical support has begun to accumulate regarding the relationship between shared leadership and team performance (e.g., Carson et al., 2007; Mehra et al., 2006), the existing research fails to more fully consider the potential impact of shared leadership on both individual members' and the teams' behavioral outcomes. In particular, we focus on team members' actions to improve their future performance by greater knowledge and understanding of their work—learning behaviors at both the team and the individual levels (Ellis, Hollenbeck, Ilgen, Porter, West, & Moon, 2003; Fiol & Lyles, 1985; Weiss, 1990). Team learning behaviors are seen as critical for improving a team's overall effectiveness and enhancing its future competitiveness (Edmondson, 1999). While scholars have documented that team formal leadership is powerful for promoting team learning behaviors (Burke et al., 2006), there is little work studying shared leadership and team learning. This is an important unaddressed gap, since with shared leadership responsibilities, team members are both leading and following one another at the same time (Carson et al., 2007), which involves frequent knowledge and information exchange and encourages the team to form a climate of learning at the team level. In addition to team learning, individual learning is also a potentially important issue as teams do not behave, and it is the individual members within the teams who behave and perform (Kozlowski & Bell, 2003), and only when individual members learn and improve their skills and performance can their team and organization grow (Cohen, 1991; Ellis et al., 2003; Kim, 1993; Yukl, 2009). However, it does not say that individuals' learning behaviors are developed in isolation. Instead, individuals are nested within teams (Hackman, 1992), and it is likely that when individual team members all share part of their leadership responsibilities, they have more opportunities to learn from each other and from their work (Ellis et al., 2003). Thus, it is critical to fully consider learning behaviors at both individual and team levels. Research focusing on one level of the learning behaviors within teams may result in an incomplete understanding of how shared leadership influences both the team as a whole and the individual members within the team and how learning behaviors are formed within the team contexts.

Another remaining gap in the shared leadership literature is the boundary conditions of the effects of shared leadership on individual and team outcomes. Although recent empirical work has demonstrated the positive influence of shared leadership on team performance (e.g., Avolio et al., 1996; Carson et al., 2007; Ensley, Hmieleski, & Pearce, 2006), the literature remains silent about under what conditions shared leadership plays a stronger or weaker role in shaping team members' behaviors. The classic contingency to leadership perspective suggests that the influence of leadership on subordinate outcomes is bounded by situational factors, such as task structure (Fiedler, 1967). Job variety, an important characteristic of task structure and defined as the extent to which a job requires the use of a variety of skills to accomplish tasks (Hackman & Oldham, 1976), may be especially relevant to individual learning because learning requires the addition of new knowledge and skills and job variety may boost individual members' motivation to learn more at work and through their peers and then strengthen the positive influence of shared leadership on learning behaviors.

Taken together, drawing on social learning theory (Bandura, 1977), the current study aims to answer the questions of *whether*, *how*, and *when* shared leadership impacts learning behaviors within the team and to extend the literature on shared leadership and work teams in at least four ways. First, joining the small group of research on shared leadership, the current study is a response to the recent calls on more research on shared leadership (Day, Gronn, & Salas, 2006; Day et al., 2004; Pearce & Conger, 2003; Pearce & Manz, 2009; Yammarino et al., 2012) and explores the role of shared leadership in shaping learning behaviors within the team. While individual learning is demonstrated to be valuable to organizational effectiveness (e.g., Cohen, 1991; Kim, 1993; Lankau & Scandura, 2002, 2007; Liu & Fu, 2011) and individual outcomes (Lankau & Scandura, 2002; Olivera & Straus, 2004; Ragins, Cotton, & Miller, 2000, research on how learning behaviors are formed within the team contexts remains scarce. Work teams are seen as the most influential social contexts for individual members (Hackman, 1992) and shared leadership among individual members are likely to create the conditions for team members to learn. Drawing on social learning theory (Bandura, 1977), we propose that shared leadership promotes both team learning and individual learning through enriching their direct and vicarious experiences at work.

Second, as Burke, Diza Granados, and Salas (2011) stated, "most of the work focuses on the relationship between shared leadership and team outcomes, with little attention on process" (p. 347). The current study aims to fill this important gap by exploring *how* shared leadership impacts individual and team outcomes and identifying team psychological safety (i.e., a shared belief among individual members within the team regarding whether they feel safe for risk taking; Edmondson, 1999) as an important mediating mechanism. Specifically, we contend that shared leadership facilitates the formation of a psychological safety climate within the team; and this psychological safety climate creates a positive learning environment within the team and guides team members to learn and acquire new knowledge and skills.

Third, the current study also advances our knowledge of the effects of shared leadership on individual and team learning by introducing job variety as an important boundary condition. We propose that although the psychological safety climate generated by shared leadership may be conducive to both individual and team learning, feeling safe alone may not be sufficient to encourage team members to learn. This is because that learning helps to acquire new knowledge (Fiol & Lyles, 1985) and when a job requires such acquirement of new knowledge, learning behaviors are more likely to occur. Thus, the current study integrates the perspectives of both shared leadership and task structure to provide a deeper examination of the motivators of individual and team learning.

Fourth, the theory and construct of shared leadership is primarily developed in the United States, and it remains unclear whether the theoretical development holds up in other cultural settings. To respond to the call of Whetten (2009) for a proper

accounting of cultural context effects, in the current study, we aim to extend the external validity of shared leadership theory by investigating our theoretical model in an Eastern country—China, a society with cultural characteristics different from Western countries (Hofstede & Hofstede, 2005). Fig. 1 depicts our overall theoretical model.

2. Theory and hypotheses

2.1. Shared leadership

Shared leadership occurs when leadership roles, responsibilities, or functions are shared by, or distributed among team members rather than taken by a single designated leader (Pearce & Conger, 2003). In contrast to conventional vertical leadership, shared leadership involves non-hierarchical relationships and describes a *relational* phenomenon (Mehra et al., 2006; Uhl-Bien, 2006) that is characterized with a dynamic, interactive influence process among individuals in the team (Carson et al., 2007; Crevani, Lindgren, & Packendorff, 2007; Gibb, 1954; Pearce & Conger, 2003; Pearce & Sims, 2002). As suggested by the existing literature, two fundamental elements defining shared leadership are sharing leadership responsibilities and mutual influence (Lambert, 2002; Pearce & Conger, 2003; Pearce & Manz, 2009; Sivasubramaniam et al., 2002; Wood, 2005). Through the process of sharing leadership responsibilities and exchanging information within the team, shared leadership may directly influence team members' behaviors and their output (Carson et al., 2007; Yukl, 1989). Empirical evidence has shown that shared leadership was positively related to team performance outcomes (e.g., Avolio et al., 1996; Carson et al., 2007; Ensley et al., 2006; Katz & Kahn, 1978; Pearce, Yoo, & Alavi, 2004; Sivasubramaniam et al., 2002). Furthermore, shared leadership is a team-level phenomenon that creates a pervasive social context for every member within the team. That is, the mutual influence among team members may not only affect teamwork as a whole but also shape the behaviors of every individual member within the team. Thus, we expect that shared leadership serves to guide both the overall team's and the individual members' learning behaviors.

Before discussing the hypothesized influence of shared leadership on team and individual learning, it is important to note that shared leadership theory was originated and developed in Western countries and thus it is worth considering whether the role of shared leadership can be applied to the specific Chinese cultural setting on which the current study is based (Whetten, 2009). As we discussed earlier, shared leadership involves distribution of leadership responsibilities among team members through mutual influence and effective coordination (Carson et al., 2007). One may argue that the preference for sharing leadership responsibilities may be culturally specific. In cultural settings with greater power distance, such as China, people tend to accept that power is distributed unequally, expect those with power to give orders (Hofstede, 1984), and thus may be reluctant to take the leadership roles and responsibilities (Chen & Tjosvold, 2012; Hofstede, 1991; Huang, Shi, Zhang, & Cheung, 2006; Kahai, Sosik, & Avolio, 2004; Nasierowski & Mikula, 1998). This cultural value is in line with the Confucian values, which are deeply rooted in the Chinese culture and suggest that each person obey and respect supervisors (Liu, 1997). However, having shared leadership does not deny the existence of external hierarchical leadership (Pearce & Sims, 2002). As Carson et al. (2007) found, external leadership can still be powerful when the internal environment is not supportive. In this regard, the power distance cultural value would not substantially affect the acceptance of shared leadership among Chinese team members. Indeed, a recent study using Research and Development (R&D) work teams in Japan, whose culture also has an emphasis on great power distance (Hofstede & Hofstede, 2005), found that Japanese teams had a relatively high mean of shared leadership (M = 3.37 out of 5) and shared leadership was positively related to team performance (Ishikawa, 2012). Furthermore, work teams have become the fact of organizational life around the globe (Hackman, 2002) and the interdependent nature of work teams necessitates interactions among individual members within the team and creates a platform for them to share responsibilities and roles (Morgeson & Hofmann, 1999; Wageman, 1995). As a result, shared leadership is likely to naturally occur within Chinese work teams and influence team members' interactions, perceptions, and behaviors. Thus, we expect that the shared leadership phenomenon does not operate significantly differently between the Western and Eastern societies, and the conceptual lines of reasoning that guide the hypotheses are not culturally bound.

2.2. Shared leadership, team learning, and individual learning

Social learning theory (Bandura, 1977) provides the theoretical underpinnings for the relationships between shared leadership and learning behaviors of and within the team. Social learning theory suggests that individuals are likely to engage in learning behaviors through *direct* experiences or *observed* experiences (Bandura, 1977). Direct experiences are gained from one's own work and observed experiences are derived from situational sources such as others' modeling behaviors. Shared leadership offers conditions for gaining both experiences for team members to learn. With shared leadership, leadership influence is not
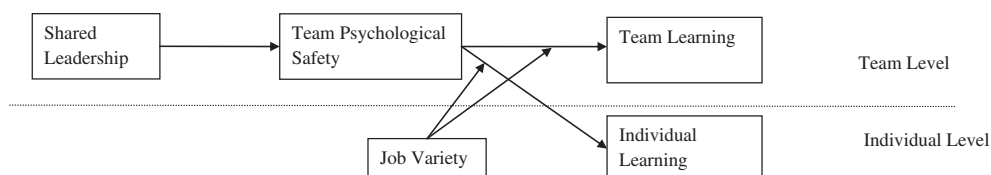

Fig. 1. Hypothesized model of the study.

exerted by one formally assigned person but shared among individual members (Yukl, 2012). That is, all individual members hold some aspects of leadership responsibilities and they are leaders and followers at the same time (Carson et al., 2007). This distribution of leadership creates mutual influence among individual members and allows them to influence others while being influenced by others. Under this circumstance, team members can serve as behavioral models for others when providing leadership for certain aspects of team functioning and also learn from others when following others' leadership guidance for different functions. Thus, team members are able to gain both direct experiences by fulfilling their roles and responsibilities and obtain observed experiences by following their teammates' modeling behaviors.

It is important to note that because team learning and individual learning are phenomena at different levels, shared leadership is expected to influence them in different ways. Specifically, team learning is a team-level construct and captures a shared perception among individual members regarding the extent to which team members engage in behaviors such as asking for feedback on performance, exchanging information for each other, and discussing ways to improve performance (Edmondson, 1999; Ellis et al., 2003). Individual learning resides at the individual level of analysis and describes how individual members behave to enhance their knowledge and performance (Liu & Fu, 2011). Although both team learning and individual learning behaviors have their origins at the individual level of analysis, they entail different meanings. Based on the relational perspective of leadership (Uhl-Bien, 2006), team learning examines the shared norms of learning within a team and reflects the interdependence and connections among individual members. Team learning is formed through a *bottom-up* process (Kozlowski & Klein, 2000) where individual members generate a similar pattern of learning behaviors through their interactions and common experiences within the team. Individual learning, on the other hand, is concerned with individual members' own enhancement of their knowledge and performance.

Shared leadership is expected to foster team learning through strengthening the interconnectivity among individual members and cultivating effective knowledge exchanges within the team. At the heart of shared leadership is the idea that individual members voluntarily provide their influence to each other with the purpose of creating effective team outputs (Carson et al., 2007; Katz & Kahn, 1978). This mutual influence facilitates interactions and coordination among team members, encourages exchanges of information, knowledge, and expertise, and allows team members to learn from their interdependent teamwork, thereby promoting a shared learning climate within the team (Edmondson, 1999; Morgeson & Hofmann, 1999).

Shared leadership is also expected to impact personal learning behaviors of individual members within the team. Shared leadership is seen as a type of "ambient stimulus" that is shared among members and pervades the overall team (Hackman, 1992). With leadership roles distributed within the team, each individual member is likely to obtain relevant information from others to assist their work and get opportunities to explore new areas and to acquire new knowledge about their work. That is, shared leadership allows individual members to learn from others on the areas they may be unfamiliar with and makes them benefit from observational learning within the team (Bandura, 1977), which enhances their accumulation of knowledge and personal learning experiences.

Hypothesis 1. Shared leadership is positively related to (a) team learning and (b) individual learning.

2.3. The mediating role of team psychological safety

As Burke et al. (2011) criticized, a critical omission in previous research concerning shared leadership is that little is known about the mechanisms through which shared leadership is related to outcome variables. As an attempt to open the black box, we further claim that shared leadership may influence both team learning and individual learning through creating an important team climate—team psychological safety. Team psychological safety refers to "a shared belief held by members of a team that the team is safe for interpersonal risk taking" (Edmondson, 1999, p. 350). Although originally perceived by individual members, team psychological safety is a reflection of a shared, collective climate at the team level and is a relational phenomenon that is unlikely to be understood by individuals independently (Edmondson, 1999). Similar to other team-level constructs such as team learning, the emergence of team psychological safety perception at the team level has been referred to as a *bottom-up* process in multilevel literature where individual members come up with a shared cognition from their teamwork process (Kozlowski & Klein, 2000; Morgeson & Hofmann, 1999). Social information processing theory (Salancik & Pfeffer, 1978) also provides the theoretical underpinning for the formation of team psychological safety, which suggests that individual members tend to seek information from their direct social contexts to form their perceptions about the team's climate. Through their interactions, exposure to common events, and shared experiences, team members are likely to possess similar perceptions regarding the extent to which their team encourages members to speak up their own ideas.

Team psychological safety may act as a bridge that links shared leadership to both team and individual learning. We develop this linking mechanism in two parts, first discussing reasons that shared leadership fosters team psychological safety and then explaining why team psychological safety facilitates both team and individual learning.

Shared leadership is first expected to cultivate a team psychological safety climate through at least three theoretical mechanisms. First, in contrast to hierarchical leadership, shared leadership is a collective process where leadership authority is diffused among members within the team. Instead of following the guidance of a formally assigned leader, individual members share the leadership authority and lead each other to achieve team goals (Fletcher & K ufer, 2003). This distribution of leadership provides all team members opportunities to express themselves and makes them feel a sense of inclusion in the teamwork, which further generates a team climate of psychological safety (Nembhard & Edmondson, 2006). Second, with leadership responsibilities shared, individual members are able to assist, monitor, and support each other's work closely (Day et al., 2004), which can build a trusting relationship among individual

members (Fredrickson, 1998; Uhl-Bien & Marion n, 2009; Weiss & Cropanzano, 1996). This positive interpersonal relationship from coworkers helps to generate team members' satisfaction with and commitment to their work (Chiaburu & Harrison, 2008) and makes them feel comfortable to speak up without being afraid of being rejected or embarrassed (Carmeli, 2007; Edmondson, 2004; May, Gilson, & Harter, 2004; Roussin, 2008). Third, from an impression management perspective, individuals are likely to be concerned about how to present good images of themselves in front of a superior who has higher power over them (Wayne & Ferris, 1990; Wayne & Liden, 1995). Shared leadership reduces such concerns and makes team members feel more authentic when communicating with their peers. As a result, team members may feel safe to freely voice their ideas and opinions about their teamwork.

This team psychological safety resulting from shared leadership in turn may encourage both team and individual learning behaviors. This is because learning new things often involves uncertainties and risks, which may create a sense of pressure or even anxiety among team members, and team psychological safety generates a comfortable zone within the team to help team members overcome this learning anxiety (Schein, 1985). A psychologically safe environment allows team members to feel free to exchange sensitive information, share special knowledge, propose conflicting viewpoints (Bradley, Postlethwaite, Klotz, Hamdani, & Brown, 2012), and identify mistakes (Lau & Murnighan, 2005), which are shown to be conducive to the shared pattern of learning behaviors within the team (Hirak, Peng, Carmeli, & Schaubroeck, 2012). Aside from team learning, team psychological safety also generates a conducive interpersonal climate where individual members can feel safe to acquire feedback and resources to improve their own work capabilities, which facilitates individual members' personal learning behaviors. In addition, knowing they will not be criticized or punished by taking well-intended risks within the team, individual members are more likely to have higher confidence in the face of obstacles and uncertainties (Edmondson, 1999), which has been shown to promote individual learning performance (Chen, Gully, Whiteman, & Kilcullen, 2000). Providing direct support to the above arguments, team psychological safety was shown to promote both team learning (Edmondson, 1999; Wilkens & London, 2006) and individual learning (Wong, Tjosvold, & Lu, 2010).

Taken together, we expect that team psychological safety acts as a mediating mechanism through which shared leadership influences team learning and individual learning behaviors. That is, shared leadership generates the mutual influence and support among team members and helps to create a psychologically safe environment within the team. This psychological safety climate, in turn, facilitates the formation of a shared pattern of learning behaviors at the team level and encourages individual members' personal learning behaviors.

Hypothesis 2. Team psychological safety mediates the relationships between shared leadership and (a) team learning and (b) individual learning.

2.4. Moderating role of perceived job variety

The above statements propose shared leadership and team psychological safety as important antecedents of team and individual learning behaviors. Having a psychologically safe climate provides a critical external environment to support learning behaviors, however, it does not offer the intrinsic conditions for learning behaviors. That is, in addition to the external favorable environment, learning behaviors require team members' intrinsic motivation to acquire new knowledge to improve their work (Bandura, 1977). Thus, team psychological safety resulting from shared leadership alone may not be sufficient for promoting high levels of learning behaviors. In the spirit of classic contingency theories of leadership (Fiedler, 1971; Vroom & Yetton, 1973), we introduce job variety as an important contingency for the learning effects of team psychological safety.

Job variety, defined as the degree to which a job requires a number of skills and talents (Hackman & Lawler, 1971), is seen as a core job design characteristic that is able to promote individuals' internal motivation (Hackman & Oldham, 1976). Compared with other elements in Hackman and Oldham's (1976) framework, such as job identity (the extent to which a job requires completion of a whole work), task significance (the extent to which a job has significant impact on the well-being of others), autonomy (the extent to which a job offers freedom), and feedback (the degree to which a job provides information about how individuals perform), the need for various skills inherent in job variety is particularly relevant to enhance team members' intrinsic motivation to learn. That is, job variety requires team members to accumulate a variety of skills, which motivates individuals to actively seek for new information and knowledge in order to perform tasks successfully. This enhanced motivation to learn is directly linked to more learning behaviors (Brief & Aldag, 1975; Colquitt, LePine, & Noe, 2000).

We further propose that job variety serves as a *situational enhancer* (Howell, Dorfman, & Kerr, 1986) that strengthens the influences of psychological safety on team learning and individual learning. When team members perceive a high level of job variety, they are more motivated to learn (Kvalseth, 1980) and more sensitive to the learning-related informational cues within the team. As a result, team members are more likely to reap the benefits of a psychologically safe climate and take efforts to seek for new information, knowledge, and feedback within the team. Therefore, with a high job variety requirement, a psychological safe team climate becomes more salient to team members, and is more likely to promote learning behaviors within the team. Conversely, when team members work on tasks that do not require various skills, even if their team has a psychological safe environment, they may be less intrinsically motivated to acquire and learn new skills and knowledge from their teammates. Thus, low job variety reduces the motivation and involvement of team members in learning new things and weakens the advantages of team psychological safety on team learning and individual learning behaviors.

Furthermore, we propose that job variety amplifies the positive influence of shared leadership on team learning and individual learning through team psychological safety. As articulated in the previous section, shared leadership facilitates the emergence of a psychologically safe climate, which further encourages team learning and individual learning. Integrating the theoretical

developments above and in Hypotheses 1 and 2, we present a second-stage moderation model (Edwards & Lambert, 2007). Job variety moderates the indirect relationships of shared leadership on team and individual learning via team psychological safety in such a way that shared leadership has a stronger indirect effect on both team and individual learning behaviors through team psychological safety when job variety is high than when job variety is low.

Hypothesis 3. Job variety moderates the positive and indirect effects of shared leadership on (a) team learning and (b) individual learning through team psychological safety. Specifically, the mediated relationships are stronger when job variety is high than when job variety is low.

3. Methodology

3.1. Research setting and participants

Before the investigation, we solicited 12 employees from 3 teams from a different organization from the participating companies in the primary study to reduce the ambiguities of the survey items. Minor modifications were made based on the suggestions from the employees in the pre-test. The primary data were collected in four large high-technology companies in China. Because the survey was not anonymous, we emphasized both in the oral presentation and the written cover letter that the purpose of the investigation was solely for academic research, and their responses were highly confidential, and only the research team has access to the data. Members from 70 work teams were invited to participate to complete an internet-based survey after providing informed consent. These participants were working in teams with different functions, such as research and development, sales, human resources, and marketing. The diverse choice of work teams serves to enhance the generalizability of the findings (Hu & Liden, 2011; Wu, Tsui, & Kinicki, 2010; Zhang & Peterson, 2011). All work teams have certain levels of interdependence among individual members (Cohen & Bailey, 1997; Hollenbeck, Beersma, & Schouten, 2012). The final effective data consisted of 50 teams and 263 individual members. The effective response rate was 87.5%. Average team size of the sample was 5.26. Of the participants, the average age was 29, 61.6% were male and 42.6% held a bachelor's degree.

3.2. Measures

3.2.1. Shared leadership
Using a social network approach (Mayo, Meindl, & Pastor, 2003), we measured shared leadership by using *density*, which measures the total sum of leadership behaviors displayed by all team members rated by their peers in a team. Specifically, we followed the previous measurement approach in social network literature (Carson et al., 2007; Sparrowe, Liden, Wayne, & Kraimer, 2001) to calculate density by dividing the sum of all peer-ratings of leadership demonstrated in a team by the total number of possible ties among team members. Every team member rated each of his or her peers based on the following question: "To what degree does your team rely on this individual for leadership?" using a scale ranging from 1, "not at all", to 5, "to a great extent". Because shared leadership represents the distribution of leadership among members in a team, the measure of density with all members rating each other's leadership appropriately captures the nature of shared leadership. This measure has been shown to be valid in previous studies on shared leadership (Carson et al., 2007; Ishikawa, 2012). Because shared leadership is a team-level phenomenon by nature, we first need to justify whether it is appropriate to aggregate individual members' leadership ratings to the team level. Following James, Demaree, and Wolf (1984, 1993), we assessed interrater agreement by computing $r_{wg(j)}$. The mean $r_{wg(j)}$ value of .76 was above the conventional cut-off value of .70 (James et al., 1984), which suggests that on average, there was a high level of agreement among individual members regarding each other's leadership within a team. Furthermore, we conducted one-way analysis of variance (ANOVA) and found significant between-group variances for shared leadership ratings, $F = 1.83$, $p < .001$. Using the ANOVA results, we then calculated the interclass correlation (ICC1) and the reliability of group mean (ICC2) to test between-group variance and within-group agreement (Bliese, 2000). The results showed that the ICC1 value of .52 and ICC2 value of .85 were comparable to those values shown in the previous studies on shared leadership (e.g., Carson et al., 2007). Thus, the calculation of shared leadership at the team level was deemed appropriate.

3.2.2. Team psychological safety
Team psychological safety was measured with four items from Nembhard and Edmondson's (2006) scale to assess the extent to which team members feel safe to speak up about issues or ideas regarding the work process. Respondents answered on a scale ranging from 1 = "strongly disagree" to 7 = "strongly agree". A sample item was "People in this team are comfortable checking with each other if they have questions about the right way to do something". The Cronbach's alpha for this measure was .90. Because team psychological safety is a team-level construct that measures the shared perception among team members regarding the degree to which the team is safe for members to voice their own opinions, we justify the appropriateness of aggregating individual members' responses to the team level of analysis. The mean $r_{wg(j)}$ of .72 exceeded the cut-off value of .70 (James et al., 1984), suggesting a high level of agreement among different raters within a team. Furthermore, the ANOVA result showed significant between-group variance resided in the ratings of team psychological safety ($F = 1.73$, $p < .01$). The ICC values further showed high between-group variance and within-group agreement, ICC1, .13, and ICC2, .59. The ICC values were comparable to the values of team psychological safety in the organizational literature (e.g., Bradley et al., 2012; Edmondson, 1999).

3.2.3. Team learning

Team learning was measured by using Edmondson's (1999) seven-item team learning measure. An example item was "We regularly take time to figure out ways to improve our team's work processes". Respondents answered on a 5-point scale ranging from 1 = "strongly disagree" to 5 = "strongly agree". The Cronbach's alpha for this measure was .94. By definition, team learning reflects a shared pattern of learning behaviors within a team. We assessed the within-group agreement to examine consensus and justify aggregation. The mean $r_{wg(j)}$ of .79 was well above the conventionally acceptable value of .70 (James et al., 1984). The ANOVA result showed that there was a significant between-group variance in the ratings of team learning, $F = 2.43$, $p < .001$. We further computed the ICC1 value as .13 and ICC2 value as .44. Even though the relatively low ICC2 may make it difficult to detect emergent relationships using group means (Bliese, 2000), the high $r_{wg(j)}$ value and between-group variance justified the aggregation (Chen & Bliese, 2002). Thus, we proceeded with aggregating individual members' ratings of team learning to the team level of analysis.

3.2.4. Individual learning

We measure individual learning by adapting Edmondson's (1999) seven-item team learning scale. The referent of the items was modified from "we/us" to "I/me" to reflect individual members' own learning behaviors (Chan, 1998). Example items were "I regularly take time to figure out ways to improve my own work processes"; and "I frequently seek new information that leads me to make important changes". We conducted a confirmatory factor analysis (CFA) to see if the measurement model fits well with the data and used the commonly accepted cutoff values (CFI < .90, NFI < .90, RMSEA < .10) as indicative of poor fit (Browne & Cudeck, 1992; Hu & Bentler, 1995, 1999). The CFA result, close to acceptable levels, provided basic support to the model in which the adapted individual learning items loaded on one factor, $\chi^2(df) = 188.924(14)$, CFI = .92, NFI = .91, and RMSEA = .10. The Cronbach's alpha for this measure was .97.

3.2.5. Job variety

Perceived job variety was measured by using Idaszak and Drasgow's (1987) three-item measure, which was adapted from Hackman and Oldham's (1974, 1975) Job Diagnostic Survey. Respondents answered on a 7-point scale ranging from 1 = "strongly disagree" to 7 = "strongly agree". A Sample item was "The job requires me to use a number of complex or high-level skills". The Cronbach's alpha for this measure was .90.

3.2.6. Control variables

Age, gender, and educational background at the individual level were chosen as control variables, since these demographic variables may influence team psychological safety and learning (e.g., Ancona & Caldwell, 1992; Edmondson, 1999; Wong et al., 2010). Age was self-reported in years. Gender was dummy-coded, with female coded as "1" and male coded as "2". Educational background was coded as "1" for below high school, "2" for below bachelor's degree, "3" for bachelor, "4" for master, and "5" for doctor. In addition, considering that learning is, in essence, an information process and structure redundancy might hinder efficient information flow (Argote & Ingram, 2000; Bierly & Hämäläinen, 1995; Gibson & Vermeulen, 2003), we controlled for team size, measured by the total number of employees of the team.

3.2.7. Analysis strategy

ANOVA results showed that there was no significant between-company variance in the ratings of shared leadership ($F = 1.43$, $p > .05$), psychological safety ($F = 1.28$, $p > .05$), team learning ($F = .53$, $p > .05$), individual learning ($F = .77$, $p > .05$), and job variety($F = 2.01$, $p > .05$). In addition, the ANOVA results showed that there was no significant between-team type variance in the ratings of shared leadership ($F = .74$, $p > .05$), psychological safety ($F = .20$, $p > .05$), team learning ($F = 1.61$, $p > .05$), individual learning ($F = .93$, $p > .05$), and job variety ($F = .74$, $p > .05$). These results suggest that it is acceptable to pool the data.

The theoretical model is hierarchical in nature, consisting of constructs spanning both the individual member level and the team level of analysis. We conducted multilevel analyses to test the hypotheses using Mplus 6.0 software (Muthén & Muthén, 2012). We used chi-square change test to examine whether the addition of a predictor significantly improves the model fit (Byrne, 2011).

Table 1
Descriptive statistics, reliabilities, and intercorrelations among measures at the individual level.[a]

	Mean	SD	1	2	3	4	5
Gender	1.62	0.49					
Age	29.46	7.15	−0.01				
Education	3.41	0.84	0.03	0.01			
Perceived job variety	5.08	1.15	−0.07	−0.03	−0.01	(0.90)	
Individual learning	5.31	0.99	0.00	0.04	−0.10	0.59**	(0.96)

[a] $n = 263$ at individual level; reliabilities of the scales are noted in the diagonals.
** All correlations with ** are significant at $p < .01$ (two-tailed test).

4. Results

Tables 1 and 2 present descriptive statistics, reliabilities, and correlations for the variables at the individual and team level of analysis, respectively.

Table 3 provides the summary of the hypothesis testing results. Hypothesis 1 proposes that shared leadership is positively related to (a) team learning and (b) individual learning. As displayed in Table 3, after including all of the control variables, shared leadership was positively related to both team learning ($\beta = .48$, $p < .001$, Model 4) and individual learning ($\beta = .50$, $p < .001$, Model 9), supporting Hypotheses 1a and 1b. In addition, the decrease in chi-squares showed that the addition of shared leadership significantly improved the fit of the model with team learning as the outcome variable ($\Delta \chi (1) = 31.94$, $p < .001$) and the model with individual learning as the outcome variable ($\Delta \chi (1) = 57.90$, $p < .001$).

Hypothesis 2 presents a mediating effect of team psychological safety in the relationships between shared leadership and (a) team learning and (b) individual learning. Following Mathieu and Taylor (2007) meso-mediational procedure, the first condition for mediation would be a significant relationship between the independent variable and the dependent variable. As described in the results of Hypothesis 1, shared leadership was positively related to both team learning and individual learning. At the second step, the independent variable needs to be positively related to the mediator. As shown in Model 2, Table 3, shared leadership was positively associated with team psychological safety ($\beta = .35$, $p < .001$), which satisfies the second criterion for testing a meso-mediation. In testing Steps 3 and 4, both the independent variable and the mediator were included in the regression model. The results from Model 5 and Model 10 revealed that even though shared leadership was still significantly related to both team learning ($\beta = .35$, $p < .001$) and individual learning ($\beta = .57$, $p < .001$), team psychological safety was significantly and positively related to team learning ($\beta = .37$, $p < .001$), and individual learning ($\beta = .55$, $p < .001$). Furthermore, the chi-square change test demonstrated that the inclusion of team psychological safety significantly improved the fit of the model with team learning as the outcome ($\Delta \chi (1) = 10.50$, $p < .001$) and the model with individual learning as the outcome ($\Delta \chi (1) = 87.60$, $p < .001$). In addition, to further assess the significance of the mediation, we applied Sobel's (1982) test for indirect effects (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002). The Sobel test results were also significant ($Z = 2.01$, $p < 0.05$ for team learning; $Z = 2.76$, $p < 0.01$ for individual learning). Therefore, team psychological safety partially mediated the relationships between shared leadership and both team learning and individual learning, providing partial support to Hypotheses 2a and 2b.

Hypothesis 3 posits that employees' perceived job variety moderates shared leadership's indirect impact upon (a) team learning and (b) individual learning via team psychological safety. We followed Ng, Ang, and Chan's (2008) approach to test the second-stage moderated mediation (Edwards & Lambert, 2007). In order to show moderated mediation, four conditions must be met: (a) a significant relationship between shared leadership and team learning and individual learning; (b) a significant relationship between shared leadership and team psychological safety, (c) significant interactions between team psychological safety and job variety in relating to team learning and individual learning after controlling for other predictor variables; and (d) significant differences in the indirect effects of shared leadership on team learning and individual learning, via psychological safety, at low and high levels of job variety.

Results of Hypothesis 1 provided support for condition 1. With respect to conditions 2 and 3, as shown in Model 7, Table 3, team psychological safety was positively related to team learning ($\beta = .21$, $p < .05$) and the interaction between team psychological safety and perceived job variety was positively related to team learning ($\beta = .05$, $p < .05$). Likewise, as shown in Model 12, Table 3, team psychological safety was positively related to individual learning ($\beta = .42$, $p < .001$) and the interaction between team psychological safety and perceived job variety was positively related to individual learning ($\beta = .11$, $p < .05$). Furthermore, to test the significance of the conditional indirect effects of shared leadership on both team and individual learning at different levels of job variety, we employed Edwards and Lambert's (2007) moderated path analysis approach. We bootstrapped with 1000 replications to construct bias-corrected confidence intervals for the significance tests of the indirect effects. Results in Table 4 show that the indirect effect of shared leadership on team learning through team psychological safety was stronger in the high job diversity condition ($P_{MX} * P_{YM} = .09$, $p < .001$) than in the low job diversity condition ($P_{MX} * P_{YM} = .05$, $p < .001$). Overall, although relatively small in magnitude, the difference in the indirect effects on team learning, was significant ($\Delta P_{MX} * P_{YM} = .04$, $p < .001$). To further determine whether the patterns of the indirect effects at high and low job variety conditions are consistent with our hypothesis, we plotted the moderating effect according to Aiken and West's (1991) approach. As presented in Fig. 2, the relationship between shared leadership and team learning via team psychological safety was stronger for employees who perceived high levels of job variety than those who perceived low levels of job variety. Therefore, Hypothesis 3a was supported.

Table 2
Descriptive statistics, reliabilities, and intercorrelations among measures at the team level.[a]

	Mean	SD	1	2	3	4
Team size	5.26	1.05				
Shared leadership	3.34	0.50	−0.03			
Psychological safety	5.13	0.64	0.10	0.56**	(0.90)	
Team learning	3.63	0.42	−0.04	0.69**	.55**	(.94)

[a] $n = 50$ at team level; reliabilities of the scales are noted in the diagonals.
** All correlations ** with are significant at $p < .01$ (two-tailed test).

Table 3
Summary of results.[a]

	Team psychological safety			Team learning				Individual learning				
	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12
Level 1												
Gender	−.08	−.09	−.11	−.09	−.05	−.05	−.04	−.01	−.02	.09	.06	−.12
Age	.05	.04	.01	.07	.06	.01	.07	.01	.04	.00	.03	.00
Education	−.15	−.09	−.02	.07	.10	.04	.04	−.14	−.03	.04	−.01	−.01
Job variety						.38**	.25***				.33***	.29***
Level 2												
Team size	.07	.10	.01	.04	.00	.01	.00	.04	.07	.01	.01	.01
Shared leadership		.35**		.48***	.35***	.28*	.21*		.50***	.57***	.15*	.31*
Team psychological safety					.37***	.21*	.21*			.55***	.48***	.42***
Cross levels												
Team psychological safety * job variety							.05*					.11*
χ^2	76.95***	60.38***	82.35***	50.41***	39.91***	3.65	0.89	172.32***	114.42***	26.82***	3.86	.89
df	5	4	5	4	3	2	1	5	4	3	2	1
$\Delta\chi^2(1)$		16.57		31.94	10.15	36.26	2.76		57.9	87.6	22.96	2.97

[a] $N = 263$ at individual level, $N = 50$ at team level. M = Model.
* $p < .05$ (two-tailed).
** $p < .01$ (two-tailed).
*** $p < .001$ (two-tailed).

Similarly, the results in Table 4 also indicate that the indirect effect of shared leadership on individual learning via team psychological safety was stronger under high job variety condition ($P_{MX} * P_{YM} = .19$, $p < .001$) than under low job variety condition ($P_{MX} * P_{YM} = .10$, $p < .001$). Overall, the differences in the indirect effects on individual learning were significant ($\Delta P_{MX} * P_{YM} = .09$, $p < .001$). Fig. 3 presents these indirect effects at high and low conditions of job variety. As shown in Fig. 3, shared leadership was more positively related to individual learning through team psychological safety at high job variety condition than at low job variety condition. Thus, Hypothesis 3b was also confirmed.

5. Discussion

Integrating literature on shared leadership, learning, and job characteristics, the current study sheds light on our understanding of *whether*, *how*, and *when* shared leadership influences learning behaviors at both the team and the individual levels of analysis. Specifically, the current study is among the first efforts to link shared leadership with learning behaviors within the team, including both team learning and individual learning. The current research proposed and found psychological safety as a mediator of the relationships between shared leadership and team and individual learning, and job variety as a moderator of the relationships between shared leadership and team and individual learning through team psychological safety. The findings of the study provide several important theoretical and managerial implications.

Table 4
Results of the moderated path analysis.[a]

	Stage		Effect		
	First	Second	Direct	Indirect	Total
	P_{MX}	P_{YM}	P_{YX}	$P_{MX} * P_{YM}$	$P_{YX} + P_{MX} * P_{YM}$
For team learning as the outcome					
Low variety (−1 SD)	.35***	.15***	.21***	.05***	.26***
High variety (+1 SD)	.35***	.27***	.21***	.09***	.30***
Difference between low and high	.00	.12***	.00	.04***	.04***
For individual learning as the outcome					
Low variety (−1 SD)	.35***	.29***	.31***	.10***	.41***
High variety (+1 SD)	.35***	.55***	.31***	.19***	.50***
Difference between low and high	.00	.25***	.00	.09**	.09**

[a] $n = 263$ at individual level, $n = 50$ at team level.
* $p < .05$ (two-tailed).
** $p < .01$ (two-tailed).
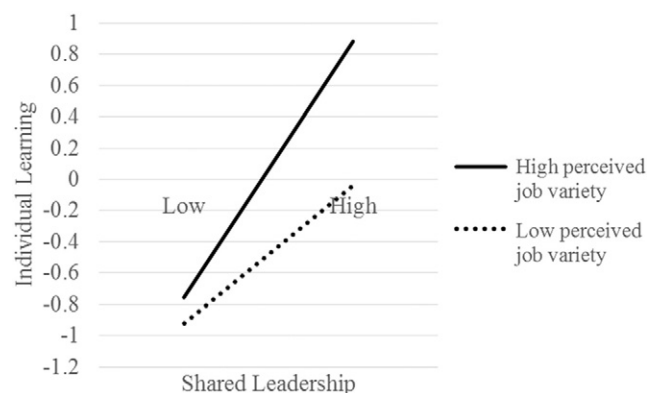*** $p < .001$ (two-tailed).
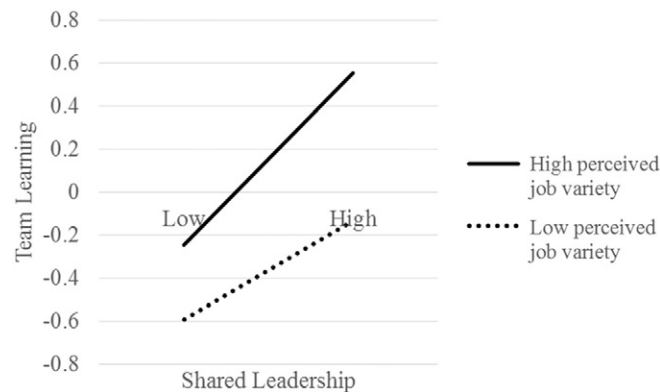
Fig. 2. The moderating effect of job variety on the relationship between shared leadership on team learning via team psychological safety.

5.1. Theoretical contributions

First, joining a handful of studies on shared leadership (Carson et al., 2007; Pearce & Conger, 2003; Pearce & Sims, 2002), the current study further confirmed that in addition to the conventional hierarchical leadership, shared leadership can play a significant role in building effective team outcomes. Specifically, we linked shared leadership with learning behaviors within the team. Learning has been consistently shown to be critical for improving work processes and enhancing performance outcomes (e.g., Edmondson, Bohmer, & Pisano, 2001; Edmondson & Moingeon, 1998; Hirak et al., 2012; Reagans, Argote, & Brooks, 2005; Weigelt & Sarkar, 2009). Although the field has made considerable progress in understanding learning in organizations and teams, the literature remains silent in the relationship between shared leadership and team learning and individual learning. Compared to formal team coaching (Edmondson, 1999), shared leadership appears to be particularly relevant to the generation of a shared learning pattern at the team level as it promotes frequent interactions, and information and knowledge exchange among team members. Indeed, as found in the current study, shared leadership had a positive influence on team learning. Furthermore, research on individual learning within teams has largely lagged behind. This omission is critical as teams can only improve through the learning behaviors of individuals within the teams (Cohen, 1991; Kim, 1993). However, it does not say that individual learning behaviors occur in vacuum, instead, they are influenced by the contexts of work teams (Hackman, 1992; Senge, 1990). As demonstrated in the current study, shared leadership at the team level directly impacted individual members' own personal learning behaviors. Thus, the findings extend both leadership and learning literature and enrich our understanding of the leadership influence on learning behaviors within the team.

A second major implication lies in considering team psychological safety as a mediating mechanism between shared leadership and learning behaviors within the team. The current study suggests that shared leadership impacts learning within the team by creating a psychologically safe environment to encourage team members to seek for new information and knowledge. The finding is an active response to previous calls on more research on the process through which shared leadership impacts team outcomes (Burke et al., 2011; Carson et al., 2007).

A third contribution of the current study is the representation of an important boundary condition of the shared leadership effects. The current study takes a step toward integrating a contingency approach of leadership and job characteristics literature. The findings of the current study reveal that creating a psychologically safe climate by shared leadership alone is not sufficient to promote learning behaviors within the team, and job variety serves a critical contingency for the learning effects of shared

Fig. 3. The moderating effect of job variety on the relationship between shared leadership on individual learning via team psychological safety.

leadership. Specifically, it was found that shared leadership was more positively related to both team and individual learning behaviors via team psychological safety when team members perceived high job variety than when they perceived low job variety.

In addition, the current study advances knowledge about the role of shared leadership in Chinese teams. Shared leadership is a construct originated and developed in Western cultures, and it remains unclear whether shared leadership can also play an important role in Eastern cultural settings. The current study brought this research question to an Eastern society—China, where power distance and collectivism are ranked higher than in most Western cultures, such as the United States (Hofstede, 1984, 1991). The results endorsed that shared leadership is conducive to team psychological safety and team and individual learning. Thus the study results extend the external validity of shared leadership. Furthermore, even though, as mentioned previously, theoretical development is not culturally specific, a higher level of power distance culture may withhold team members' engagement in sharing leadership power within the team, so that the impacts of shared leadership on team and individual outcomes are likely to be weakened. Future research may replicate the study using teams in both Western and Eastern societies and see if the effects of shared leadership differ in different cultural settings.

5.2. Practical implications

Team and individual learning is of great significance for the success of individuals, teams and organizations. The findings of our study thus may have useful implications to management practitioners. First, the findings suggest that shared leadership can be a useful way to facilitate learning behaviors at both the team level and the individual level of analysis. Thus, managers and organizations may be supportive of the form of shared leadership and encourage team members to share leadership roles and responsibilities. Second, our research presents team psychological safety as a bridge that links shared leadership to positive learning outcomes within the team. Thus, organizations may assist with work teams to create a psychologically safe environment by motivating them to speak up their own ideas and making them feel comfortable to take risks. Training programs may be beneficial for guiding team members to express their doubts and viewpoints, and to be open to others' ideas and input.

Furthermore, our research demonstrates that job variety strengthens the relationship among shared leadership, team psychological safety and team and individual learning. Since employees will be motivated to learn when they know that they have opportunities to learn and use different sets of skills (McClelland, 1984), management should work towards enlarging and enriching job categories to increase job variety. Practices like job rotation, job sharing, and skill training programs may help organizations to enhance the level of job variety.

In addition, the current study also sheds light on cross-cultural business management practices. While one would expect that the management of Eastern work teams should be handled differently than the management of Western teams due to the cultural differences (Farh, Hackett, & Liang, 2007), the findings from the current investigation, using data from China, indicate a high degree of consistency with the shared leadership and learning theories developed and primarily tested in the United States. Thus, the current study helps us to reshape our conventional thinking about managing teams in non-Western settings. Western managers, especially expatriates in China, should be aware that, irrespective of country-level cultural differences, shared leadership serves to encourage members in Chinese teams to learn and cooperate through creating a psychologically safe climate within the team. Joining Carson et al. (2007), we recommend that managers should pay more attention to the shared leadership and work team theories developed in the West and effectively utilize them to guide work teams in the Eastern business environment.

5.3. Limitations and future research

As with most studies, this one is not without limitations. First, the cross-sectional design precludes any conclusions about the causality of the variables in the model. For example, it is likely that within a team where it is safe to speak up, team members are more willing to share the leadership responsibilities and roles. We then tested a competing model that reversed the direction of the relationship between shared leadership and team psychological safety climate. The result showed that team psychological safety was positively related to shared leadership ($\beta = .16$, $p < .01$). However, with the degrees of freedom unchanged, the competing model demonstrated an increase in chi-square of 16.71, which suggests that this altered path made for worse model fit compared with the hypothesized model. Nevertheless, future research is encouraged to employ longitudinal data or conduct a laboratory experiment to make a stronger argument on the causality of the studied relationships.

Second, most of the study variables, except for shared leadership, were obtained from the same source, which may have introduced a common method bias. However, we don't feel that common method bias is severe in our data because shared leadership is obtained by peer ratings and calculated by a social network approach, and constructs at different levels have different referents. Furthermore, we employed Harman's single-factor test (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003) with an unrotated exploratory factor analysis (EFA) using principal axis factoring, and found no systematic variance common to the measures, with the loading for the first principle component only .29.

Next, although shared leadership was found to be effective in the Chinese context, we have not compared the effects of shared leadership and vertical leadership on team outcomes (e.g., Carson et al., 2007). It will be a potentially valuable addition to the literature for future research to compare these two types of leadership and their influences on team and individual outcomes.

Lastly, we could not directly test many other relevant boundary conditions of the effects of shared leadership on team and individual outcomes, such as task interdependence, team member characteristics, and cultural values (Carson et al., 2007; Pearce

& Conger, 2003). There are a number of team and member characteristics that are potentially related to the shared leadership influence process, which makes it difficult to test all of the boundary conditions in one study. However, it would be a promising research direction for future research to further explore under what conditions shared leadership is more likely to be effective.

In conclusion, the current study linked shared leadership with team and individual learning, and identified team psychological safety as a mediator and job variety as a moderator of such linkages. The findings contribute to our understanding of the role of shared leadership within teams and how and when shared leadership can play a role in team and individual learning. We hope the current study may encourage more future research to explore the relationships between shared leadership and team and individual outcomes.

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