


Why and when do emotionally intelligent employees perform safely? The roles of thriving at work and career adaptability

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Abstract

Based on the socially embedded model of thriving, the present study examined a moderated mediation framework, which involves the mediating role of employee thriving and the moderating role of career adaptability in the relationship between emotional intelligence (EI) and safety performance. A two-wave survey was administered among full-time commercial pilots working for airlines ($N = 131$). Our results showed that EI had a positive influence on employee thriving, which in turn positively affected safety performance. In addition, the results further revealed that the positive effect of EI on safety performance was stronger among pilots with a higher level of career adaptability. These findings have important implications for theoretical developments on EI, thriving, and performance in a safety context, and they also provide practical insights on how to enhance workplace safety.

KEYWORDS

career adaptability, emotional intelligence, safety performance, thriving

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INTRODUCTION

Individuals' unsafe behaviors account for a significant proportion of safety-related incidents and accidents at the workplace (Ioannou et al., 2017; Kvalheim & Dahl, 2016; Luo et al., 2017). Especially in safety-critical sectors such as aviation, human factors (e.g., pilots' behavioral errors) are considered the predominant cause of aircraft accidents (Gonçalves Filho et al., 2019). Data show that on average more than 70% of aviation accidents are caused by pilots' unsafe performance (Kelly & Efthymiou, 2019). For example, in China, although the percentage of civil aviation accidents caused by machinery problems has decreased over the past three decades, the proportion of accidents attributed to pilots' unsafe acts has been increasing (Ma et al., 2022). This raises the importance of continued efforts to study employees' safety-related behaviors or performance in safety-critical industries (e.g., aviation). As per Griffin and Neal (2000), safety performance primarily includes two types of safety behaviors: safety compliance and safety participation. The former refers to the engagement in compulsory tasks one must complete to maintain workplace safety (e.g., following safe procedures and wearing personal protection equipment), while the latter involves attending to non-compulsory safety-related tasks that can help support workplace safety (e.g., helping co-workers with safety-related jobs and voluntarily attending safety meetings). These two types of safety performance work as a whole concept to reflect an individual's daily safety activities. Considering the severe consequences of unsafe behaviors, scholars have explored numerous antecedents that can impact safety performance (e.g., Christian et al., 2009), such as safety climate (Guo et al., 2016; Neal & Griffin, 2002), safety leadership (Clarke, 2013; Lyubych et al., 2022), job characteristics (Turner et al., 2012), and personality differences (Hogan & Foster, 2013).

Recently, researchers have observed significant positive impacts of emotional intelligence (EI) on workplace health and safety (Ifelebuegu et al., 2019; Olawoyin, 2018; R. Y. Sunindijo & Zou, 2013; Y. Sunindijo & Zou, 2012). EI refers to an individual's ability to recognize one's own and others' emotions, understand emotions, use emotions to guide thinking, and regulate emotions to promote growth (Mayer et al., 2011). Previous research showed that emotionally intelligent individuals tend to stick to safety principles and prefer not to undertake high-risk behaviors that will jeopardize safety (Arnau-Sabatés et al., 2012). The explanation rests on the fact that high-EI individuals have strong self-awareness of their strengths and weaknesses and can effectively control their behaviors under pressure, stress, changes, or other adversities. Similarly, Jeffries (2011) has suggested that EI facilitates positive safety attitudes that can lead to genuine safe work behaviors, such as adhering to safety rules, following safety procedures, and helping to solve safety issues.

Although these studies shed some light on the relationship between EI and safety performance, the underlying mechanism for this relationship remains less clear. There is limited research that has attempted to explain why or how EI contributes to workplace safety. For example, Sunindijo and Zou (2013) focused on the effect of EI on promoting leaders' safety management skills so as to improve overall safety performance (e.g., enhanced safety climate). More recently, Wang et al. (2021) examined the cognitive ability to sense situations as a mechanism linking EI to employees' safety performance. Although this emerging empirical work has contributed to our understanding of the cognition- and/or capability-based processes behind the effect of EI on safety performance, some key questions remain unanswered. For instance, given that EI is an emotion-related attribute, do employees' emotional or affective experiences also constitute part of the mechanism that explains the EI and safety performance linkage? Also, besides contextual resources or constraints examined previously (e.g., Wang et al., 2021),

is EI intertwined with other personal resources that benefit employees' psychological experiences for better safety performance?

These areas are unfortunate omissions in the safety literature, for EI impacts not only cognition but also affect (Kafetsios & Zampetakis, 2008), and individuals differ in their capabilities or motivations to leverage EI to their advantage (Gohm et al., 2005). Unless these questions are answered, we will remain unable to gain meaningful insights on how to enhance safety performance from the EI perspective. To advance the knowledge about the EI and safety performance linkage, we aim to answer these questions by testing a moderated mediation framework (Figure 1) in airline pilots. The pilot population is well situated to study safety performance due to the severity of the consequences of human-related flight risks (de Sant & de Hilal, 2021). Flight safety, largely maintained by pilots' safety behaviors, is consistently prioritized in aviation contexts (You et al., 2013). Given that aviation is a typical industry, which role models safety management (e.g., Gander et al., 2011), revealing how and when the safety performance of pilots can benefit more from EI will not only carry implications for the aviation sector but generate a wider impact on other safety-critical industries.

In this study, we introduce thriving at work, which denotes an individual's joint feeling of vitality and learning (Spreitzer et al., 2005) as a potential mediator between EI and safety performance. We consider thriving because it is a combination of cognitive (i.e., learning) and affective (i.e., vitality) components, and this nature enables us to address the shortcomings in prior safety studies (e.g., Sunindijo & Zou, 2013; Wang et al., 2021), which mainly concentrate on a cognition-based mechanism to explain how safety performance benefits from EI. Thriving is a positive psychological state, which is not only driven by emotional competence keeping one affectively positive (Collie & Perry, 2019) but carries important implications on workplace health and safety (e.g., Okros & Virga, 2022). The safety literature has highlighted that behaving safely can largely depend on effective learning (e.g., acquiring safety knowledge) and positive affective experience (e.g., being energetic), in that these cognitive and emotional elements together may motivate one to be committed to workplace safety (e.g., Burke et al., 2011; Christian et al., 2009). This perspective suggests that safety performance can be potentially fostered through a sense of thriving, which is maintained by emotional competence (e.g., EI). Thus, we argue that thriving can be a mediation mechanism explaining how safety performance is driven by EI.

Additionally, we introduce career adaptability as a boundary condition (i.e., moderator) that influences how pilots' safety performance builds on EI via thriving at work. Research suggests that engaging in safety behaviors, which is an ongoing process persisting throughout pilots' entire careers, sometimes can be felt routine and stressful, and thus requires continuous adaptation that enables them to thrive in safety-critical contexts sustainably (Douglas & Pittenger, 2020). As such, career adaptability, which refers to one's psychological capability to

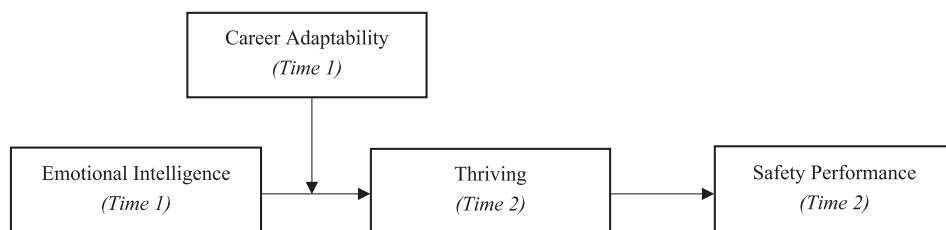


FIGURE 1 Proposed conceptual model.

continuously adapt to dynamic changes and stressors in work and career settings (Savickas & Porfeli, 2012), may potentially facilitate pilots utilizing personal resources to grow and perform in a safety environment. As a motivational factor, career adaptability can drive people to leverage existing individual strengths (e.g., EI) to reach desirable states (Guan et al., 2014), which drive their forward development or positive changes in behaviors. On these bases, as elaborated in detail later, we further contend that career adaptability can strengthen the role of EI in shaping employees' thriving state, which promotes their safety performance.

Taken together, we examine the relationship between EI and safety performance, focused on thriving as a mediator and career adaptability as a moderator. This study makes several important contributions to the literature. First, by examining the mediation effect of thriving, the study reveals a new mechanism that explains how safety performance can be influenced by person-related factors such as EI. By capturing both affective and cognitive states, this mechanism extends prior theoretical frameworks of safety performance (e.g., Christian et al., 2009; Griffin & Neal, 2000), which are limited to cognition- and capability-driven mediators such as cognitive ability, safety motivation, and safety knowledge (e.g., Chen & Chen, 2014; Wang et al., 2021). Second, by investigating the moderating role of career adaptability, this study has identified a new boundary condition that influences how safety performance is driven by EI through thriving. It serves as an empirical foundation to shed light on how the variation in the process of safety performance development may be interpreted from a career perspective. In doing so, it also provides a starting point to explain safety performance by integrating adaptation-related theories (e.g., Savickas, 1997; Spreitzer et al., 2005) and existing theoretical models of workplace safety (e.g., Christian et al., 2009). At a practical level, the present study can enlighten managers regarding how they can draw upon employees' personal and career resources to foster a workforce committed to safety performance.

HYPOTHESIS DEVELOPMENT

EI, thriving at work, and safety performance

We propose that thriving at work can help explain why EI may influence employees' safety performance. We first theorize the relationship between EI and thriving, and then, we discuss the relationship between thriving and safety performance. Thriving at work is an important positive psychological state that drives employees' development, growth, and performance. It is a positive subjective experience where individuals feel vitality and learning simultaneously (Spreitzer et al., 2005). That is, thriving denotes a condition in which one feels enjoyment and energy from his/her work and learns and applies new knowledge and skills to enhance self-development to a higher level. Vitality and learning are two critical components that both need to exist to constitute a thriving stage. Lacking one of these two conditions, an individual cannot experience a sense of thriving (Porath et al., 2012). For example, when an individual is full of energy when performing his/her job tasks but is not learning new things or gaining new knowledge, he/she is not thriving. In contrast, one may be gaining new knowledge and skills at work but hardly feel invigorated, energetic, or inspired; such an individual is not thriving either (Spreitzer et al., 2005).

EI has been defined as the personal capability to appraise one's own and others' emotions, regulate emotions, and use emotions to guide thinking, decision-making, and behaviors (Salovey & Mayer, 1990). We expect EI to promote employee thriving for several reasons. First,

emotionally intelligent individuals are likely to experience positive rather than negative emotions (Kafetsios & Zampetakis, 2008), and they therefore have a greater tendency to feel energetic and vital at work and to be psychologically ready to learn new things (Kleine et al., 2019). Researchers suggest that employees with higher EI have greater flexibility and stronger capabilities to manage undesirable emotions (e.g., tension, nervousness, frustration, and anxiety) and thus are better able to stay emotionally positive (Zeidner et al., 2004). Lyubomirsky et al. (2005) highlighted the critical roles of positive emotions in fostering individuals' long-term flourishing. When experiencing positive emotions, individuals are driven to expand their thinking and behave actively to approach resources in an uptrend way and ultimately to thrive (Spreitzer et al., 2005). Indeed, encountering setbacks or challenges at work (e.g., demanding workload, stressful deadlines, and tense co-worker relationships) may cause unpleasant emotional experiences (e.g., anxiety, frustrations, and anger), which can consume individuals' mental energy and prevent them from thriving (Porath et al., 2012). However, in this situation, emotionally intelligent individuals, being self-sufficient in managing negative emotions and emotional fluctuations, would thus be better able to sustain their energy, which is needed for them to thrive.

Second, high emotionally intelligent employees are likely to undertake agentic actions that enable them to gain energy and learn at work. A socially embedded model of thriving (Spreitzer et al., 2005) highlights that personal resources prompt employees to engage in agentic behaviors such as heedful relating, exploration, and task focus, which are essential enablers of thriving. EI can potentially trigger employees' engagement in these agentic actions. For example, emotionally intelligent employees tend to create a comfortable work environment that enables them to sustain passion for their job and enjoy learning to grow by heedfully establishing high-quality quality relationships with co-workers and supervisors (Sears & Holmvall, 2010). These relationships represent motivational social exchange resources at work, which have been found to positively influence thriving (Walumbwa et al., 2020). In addition, as EI can compensate for the limitations of cognition capability and offers new ways of reasoning, thinking, and solving problems (Mayer et al., 2016), employees with higher EI may be more likely to explore new things at work (e.g., experimenting with new ways of performing tasks or managing working relationships). In line with this view, empirical research (Hahn & Lee, 2013) has reported a positive effect of EI on workplace exploration, which is defined as one's pursuit and experimentation of new knowledge and things yet to be known. Furthermore, given that EI helps employees effectively deal with the adverse effects of unstable emotions (Mayer et al., 2016) and facilitates their use of emotions to achieve goals (Wong & Law, 2002), those with stronger EI may encounter fewer obstacles, and have greater motivation, to focus on work tasks (Rode et al., 2007). Engaging in these active, purposeful behaviors (i.e., heedful relating, exploration, and task focus) allows them to gain new knowledge and develop a sense of vitality, and thus are thriving. In brief, this line of reasoning suggests that employees with higher EI are more likely to thrive.

Hypothesis 1. EI has a positive relationship with thriving at work.

It is vital to enable employees' thriving because thriving individuals usually exhibit positive work outcomes. Thriving at work leads individuals to sense the meaning of their job, directs them to accomplish their in-role and extra-role tasks above a high standard, and contributes to a positive social environment (Spreitzer et al., 2005; Zhang et al., 2019). Empirical researchers have reported the impacts of thriving on individuals' work performance. For example, Elahi et al. (2020) confirmed that employees with continuous, high-level thriving showed intense task engagement and gained higher performance ratings (Porath et al., 2012). Furthermore, some

studies found that thriving employees tend to perform better on job tasks (in-role performance) and engage in organizational citizenship behavior (extra-role, contextual performance) (Kleine et al., 2019). The literature is clear that maintaining employees in a thriving status at daily work is desirable for both employers and employees as it is an essential factor to improve productivity, efficiency, and performance at both the organization and individual levels (Porath et al., 2012; Usman et al., 2020). However, the existing studies on thriving have primarily focused on general or overall work performance, either in-role or extra-role, and have yet to reveal the roles of thriving in affecting specific domains of performance in contextualized settings. For example, to date, a meager few studies have examined the influence of thriving on safety performance, a critical, specific aspect of work performance, which needs special attention in safety-critical work contexts (Neal & Griffin, 2006). To contribute to this area, in this study, we argue that employees who are more thriving tend to perform better in safety-related contexts.

Safety performance consists of two interrelated components, safety compliance and safety participation (Neal & Griffin, 2006). Safety compliance involves one performing the core, compulsory tasks directly related to safety, and it reflects the in-role (task) nature of performance. Safety participation involves a person voluntarily performing activities that are beyond normal work duties to promote safety in the workplace, and it reflects the extra-role (contextual) nature of performance. Griffin and Neal (2000) claimed that motivation, knowledge, and skills are proximal enablers of safety performance. Safety compliance requires an individual to apply specific safety expertise, knowledge, and skills and to correctly apply these following safety instructions to maintain safe operation (Griffin & Curcuruto, 2016). Thriving individuals are in a state in which they are continuously learning and feeling vital (Spreitzer et al., 2005). While learning allows them to gain the required knowledge and skills that are needed to comply with safety procedures in core work tasks, vitality may provide them with strong motivational energy that enables them to apply the acquired knowledge and skills to ensure workplace safety. Although there is no direct empirical evidence, past research on general work performance offers some indirect support. For example, prior studies have found that thriving enhances individuals' work engagement (Abid et al., 2018; Elahi et al., 2020) and leads them to a higher level of task performance (Kim et al., 2013). Based on this line of argument, we suggest that thriving can prompt safety compliance, for thriving individuals are engaged in learning and are full of psychological energy and thus can develop better knowledge/skills and motivation to comply with safety instructions and procedures.

Likewise, safety participation, which refers to the indirect safety-related activities in which employees volunteer to be involved in order to help maintain work safety (Griffin & Curcuruto, 2016), also requires one to develop safety-related knowledge, skills, and motivations to go beyond compulsory safety requirements. As stated earlier, thriving employees can gain safety expertise when they are engaged in learning. Beyond expertise, voluntary activities require extra contribution and sometimes sacrifice of personal time and interests, and thus, they require employees to have sufficient energy that can motivate their engagement in these extra-role activities (Gilmore et al., 2013). Thriving, which is characterized by high-level vitality, might be able to provide this motivational energy for employees' voluntary participation in promoting safety. Walumbwa et al. (2018) have shown that thriving enhances individuals' affective commitment to the organization as they experience continuing growth, and as a result, they are willing to improve their performance to ensure consistency with this emotional attachment/bond. Taking part in voluntary activities is a good way to give back to the organization. Many studies have verified that thriving employees exhibit active participation in voluntary work

(Frazier & Tupper, 2018; Spreitzer et al., 2012). Following this rationale, in a safety context, individuals who are thriving may be willing to put extra effort into working toward safety goals. Considering the potential role of thriving in fostering safety compliance and participation, we expect thriving to exhibit a positive relationship with safety performance.

Hypothesis 2. Thriving is positively related to an individual's safety performance.

As discussed above, EI has the potential to promote employees' thriving at work. When employees are thriving, they may be able to perform effectively in a safety context. Therefore, EI may enhance employees' safety performance by enabling their thriving experiences. Thus, we propose a mediation hypothesis:

Hypothesis 3. Thriving can mediate the relationship between EI and safety performance.

The moderating role of career adaptability

Safety-critical contexts require employees to be adaptable and resilient in their professional settings, for these contexts constantly produce stressors (e.g., high tension and anxiety due to the intense attention needed to ensure safety) that people need to cope with (Huber et al., 2015). That means adaptability in work and career may play an important role in assisting employees to navigate occupational environments where safety performance is essential. Since, as noted earlier, EI may potentially contribute to employees' safety performance by fostering a thriving experience in safety contexts, we contend that their career adaptability, which is construed as a set of self-regulatory capabilities in environmental adaptation, will serve as a moderator that strengthens the utility of EI in shaping a sense of thriving and then promoting safety behaviors. This contention is in line with previous researchers who argued that the influence of EI on work-related performance can be subject to some boundary conditions (e.g., Jordan et al., 2010). For instance, Wong and Law's (2002) study showed that EI has higher predictive validity on work performance in a more emotional or stressful context, which shares commonalities with safety-critical occupational settings (e.g., pilots' work environments). Farh et al. (2012) also showed that the EI–performance relationship becomes more positive as work demands/stressors increase. This existing body of work has focused on the main or indirect effect of EI on work-related outcomes, primarily attending to moderators that are closely related to one's stressful work contexts. Extending this work, we explore a personal moderator, career adaptability, which facilitates employees' adaptation to such work contexts, in the effect of EI on thriving and subsequently on safety performance.

Career adaptability refers to individuals' adaptability to cope with workplace changes, master challenging situations (e.g., performing safely in high-risk work environments), and manage career difficulties (Savickas, 1997). To measure individuals' ability to adjust to changes, demands, and challenges at the workplace, Savickas and Porfeli (2012) framed career adaptability as a construct of four dimensions, including career concern (caring about future task changes), career control (taking responsibility for one's own career development), career curiosity (exploring work and career possibilities and opportunities), and career confidence (believing in one's own abilities to realize career goals). These four aspects are unified as a whole construct that has been proven to be positively related to positive employee outcomes such as job

satisfaction, work engagement, and job performance (Hamtaux et al., 2013; Ohme & Zacher, 2015; Rasheed et al., 2020). Research suggests that career adaptability can facilitate individuals in maximizing the benefits of motivational self-concept and minimizing the detrimental effects of undesirable personal attributes on their employment and work outcomes (e.g., Amarnani et al., 2020; Savickas, 1997). This function of career adaptability denotes its role in enlarging the positive influence of one's motivational personal characteristics on his or her work status or outcomes. For example, with stronger adaptability, other person-related motivational factors might be more effective in maintaining psychological states that motivate one to engage in workplace safety. Below, we theorize how EI's role in shaping a safety-enabling psychological status (i.e., thriving) varies with the level of career adaptability.

Our earlier discussion indicates that EI, which is motivational in nature (Wong & Law, 2002), promotes individuals to engage in agentic behaviors that enable them to thrive in a safety-critical occupational environment. As career adaptability increases, they are better able to manage the difficulties and challenges in career and work settings (Guan et al., 2015). This helps smooth the process for high-EI employees to engage in the active, purposeful behaviors needed for achievement of a thriving state in safety contexts. A main reason is that career adaptability equips employees with abundant self-regulatory resources that prevent them from getting stuck in unpleasant emotional experiences, which are a major barrier to safety performance (Chan & Singhal, 2013). As Fiori et al. (2015) found, individuals with strong career adaptability tend to develop positive emotions and are less likely to experience negative emotions. From this perspective, individuals with higher career adaptability may be in a better psychological (affective) condition to leverage EI to pursue a thriving status through undertaking agentic behaviors in safety contexts. This is to some extent consistent with the scholarly assertion that career adaptability makes individuals willing and able to engage in behaviors that can keep them psychologically positive, and they tend to take advantage of various existing personal resources or attributes to make this happen (Guan et al., 2014). For example, when people have strong career adaptability, they might be willing and able to utilize their EI to assist with agentic behaviors (e.g., heedfully establishing high-quality relationships with others at work), which enables them to thrive. Conversely, even when individuals are emotionally intelligent, they may not be able or adaptive (willing or motivated) to leverage their EI in this process if they do not have sufficient career adaptability resources to do so. This conjecture is further consolidated by existing studies that found career adaptability to be a moderator that strengthens the relationship between motivational individual characteristics and positive psychological states (e.g., Gong et al., 2018; Guan et al., 2014). As such, we predict that career adaptability can strengthen the effect of EI on thriving, which is a safety-enabling psychological state.

Hypothesis 4. Career adaptability moderates the relationship between EI and thriving such that this relationship will be stronger when career adaptability is high rather than low.

According to our elaborations above, EI could potentially lead to an employee's sense of thriving at work, which in turn may enable them to demonstrate higher safety performance (Hypothesis 3). Also, career adaptability has the potential to strengthen the effect of EI on thriving (Hypothesis 4). Integrating these propositions indicates a potential moderated mediation, which denotes conditional indirect effects of EI on safety performance via thriving across low and high levels of career adaptability. As highlighted earlier, career adaptability might serve as

a moderator that accelerates the positive effect of EI. Thus, we expect that the indirect effect of EI on safety performance via thriving will be stronger when career adaptability is higher.

Hypothesis 5. Career adaptability will moderate the mediating relationship between EI and safety performance such that the relationship is stronger for individuals having relatively higher level career adaptability than for individuals having relatively lower level career adaptability.

METHODS

Participants and procedure

The data of this study were collected from full-time commercial pilots at airlines in mainland China via a two-wave survey. Participants were recruited via the lead author's professional network and responded to either online or paper questionnaires. The lead author contacted a fleet manager of an airline who assisted with promoting this study to other airlines. For online questionnaires, the potential participants were sent invitations containing a hyperlink to the online survey. Paper questionnaires were placed in envelopes and distributed to participants in a meeting room at their company headquarters when they were not flying. At Time 1, the pilots responded to demographic characteristics and answered questions regarding EI, thriving, and career adaptability. At Time 2, about 1 month after Time 1, they finished the second short questionnaire, which included the measure of safety performance.

Two hundred and eleven pilots returned usable surveys at Time 1, representing 79.3% of those who received the survey. One hundred and sixty-one pilots (76.3%) sent back valid responses. Using unique codes created by the participants, we successfully matched data for 133 participants who answered both surveys. The majority (97.7%) of this sample were male pilots. They had a mean age of 28.7 years ($SD = 4.1$) and mean job tenure of 38.9 months ($SD = 41.3$). All held at least a higher education qualification.

Measures

The measures we used for the variables in this study were originally written in English. A back-translation approach (Brislin, 1980) was applied to translate them into a Chinese version. Participants responded to the measurement items on a five-point Likert-type scale ranging from *strongly disagree* (1) to *strongly agree* (5) unless otherwise specified.

EI

Wong and Law's (2002) measure of EI was used to assess participants' self-perceived EI capabilities. This measure included four aspects that reflect an individual's self-perceived EI: appraisal of one's own emotions, appreciating others' emotions, regulation of emotions, and using emotions to achieve goals. Example items were "I am a good observer of others' emotions" and "I am able to control my temper and handle difficulties rationally." Cronbach's α was .89.

Thriving

Six items by Jiang (2017) measured pilots' thriving at work. This six-item scale of thriving was developed through Jiang's adaptation of Porath et al.'s (2012) 10-item scale to fit the Chinese context. An example item was "I feel very energetic." Cronbach's α for thriving was .87.

Safety performance

We used Griffin and Neal's (2000) seven-item scale to measure pilots' safety performance at work. Example items were "I use the correct procedures for carrying out my job" and "I voluntarily carry out tasks or activities that help improve workplace safety." Cronbach's α was .93.

Career adaptability

The 24 items developed by Savickas and Porfeli (2012) were employed to measure individuals' career adaptability, which included their career concern, career control, career curiosity, and career confidence. Example items were "Thinking about what my future will be like," "Making decisions by myself," "Probing deeply into questions I have," and "Working up to my ability." Participants indicated how strongly they had developed the capabilities described in these items on a five-point Likert-type scale ranging from *not strong* (1) to *strongest* (5). Cronbach's α was .89.

Control variables

The literature suggests that gender, age, and job tenure could potentially impact the mediating and outcome variables of this study. For example, using a Chinese sample, Jiang et al. (2020) found that older individuals tended to be less thriving at work. In a study by Niessen et al. (2012), male employees were found to be more likely to thrive than their female counterparts, particularly in terms of the learning component of thriving. In addition, Hu et al. (2016) reported that employees with longer job tenure were less likely to comply with safety procedures at work. Xia et al. (2018) showed that older workers demonstrated lower levels of safety participation. In consideration of these findings, this study controlled these variables in the data analysis. Furthermore, because the safety performance was self-reported by the pilots, there was the potential for their self-rated performance to be subject to social desirability. We used Hays et al.'s (1989) five-item measure to assess social desirability, which was intended to be used to explore if self-reported safety performance would be biased by participants' personal preference to overrate their own behaviors that are socially desirable. According to some researchers (e.g., Cheng et al., 2012), the impact of social desirability is negligible if the results remain similar even if social desirability is controlled for. An example item is "I sometimes try to get even rather than forgive and forget" (reverse coded). Cronbach's α for social desirability was .63.

Data analysis

Following Bernaards and Sijtsma (2000), missing data were processed by multiple imputations. For example, if a participant missed a few but not all items for a particular variable, the missing values were replaced based on the full information maximum likelihood (FIML). Participants who missed all items for a variable were excluded from the analyses. After the screening, three participants that missed demographic information were excluded, leading to 130 participants being used for confirmatory factor analysis (CFA) and 127 participants included in correlational tests and hypothesis testing.

First, we conducted CFA in AMOS to test if our four focal variables (i.e., EI, thriving, career adaptability, and safety performance), which were measured by multiple items, could be distinguished. Given that our sample size was relatively small while having a relatively large number of measurement items, we followed Little et al.'s (2002) advice and created item parcels to minimize inflation errors. Four parcels were created for EI and career adaptability respectively, and two parcels were created for thriving and safety performance respectively. Following the internal-consistency approach endorsed by Kishton and Widaman (1994), the individual dimensions of these constructs were treated as their respective parcels. As per Little et al., this parceling approach could help capture the internal factorial structure of a construct. The moderation hypothesis (Hypothesis 4) was examined using hierarchical regression analysis. The mediation and moderated mediation hypotheses (Hypotheses 1–3 and Hypothesis 5) were tested with PROCESS for SPSS (Hayes, 2014).

RESULTS

CFA

According to the CFA results, EI, career adaptability, thriving, and safety performance were distinct constructs in our data. These results are shown in Table 1. In light of prior research (e.g., Hu & Bentler, 1999), it can be claimed a model will fit the data if most of these criteria are met: RMSEA < 0.08, SRMR < 0.08, and CFI > 0.90. In this study, the four-factor model ($\chi^2 = 74.55$, $df = 48$, $p < .01$, RMSEA = 0.07, SRMR = 0.05, CFI = 0.97) met these criteria, suggesting a good model fit. Chi-square difference tests showed that the model fit of the four-factor model was significantly better than that of the alternate models. These results provided clear evidence that EI, thriving, career adaptability, and safety performance could be distinguished in our study. Therefore, these variables could be examined as separate variables in the following analyses.

Descriptive statistics

The mean, standard deviations, and correlations of our control and key variables are shown in Table 2. EI was significantly and positively associated with safety performance ($r = .25$, $p < .01$) and thriving at work ($r = .49$, $p < .001$). As expected, there was also a significant, positive correlation between thriving at work and safety performance ($r = .30$, $p < .01$).

TABLE 1 Confirmatory factor analysis (CFA) results.

Models	χ^2	df	$\Delta\chi^2$	Δdf	χ^2/df	SRMR	RMSEA	CFI
Four-factor model	74.55*	48	—	—	1.55	0.05	0.07	0.97
Three-factor model A (EI and thriving were combined)	108.66***	51	34.11***	3	2.09	0.07	0.09	0.93
Three-factor model B (thriving and SP were combined)	217.14***	51	142.59***	3	4.26	0.09	0.16	0.78
Three-factor model C (EI and CA were combined)	82.87***	51	8.32***	3	1.62	0.06	0.07	0.96
Three-factor model D (CA and SP were combined)	232.89***	51	158.34***	3	4.67	0.10	0.17	0.76
Three-factor model E (EI and SP were combined)	226.57***	51	152.02***	3	4.44	0.10	0.16	0.77
Three-factor model F (CA and thriving were combined)	116.86***	51	42.31***	3	2.29	0.07	0.10	0.91
Two-factor model A (EI and CA were combined; thriving and SP were combined)	224.84***	53	150.29***	5	4.24	0.10	0.16	0.77
Two-factor model B (EI and thriving were combined; CA and SP were combined)	261.46***	53	186.91***	5	4.93	0.11	0.17	0.73
Two-factor model C (EI and SP were combined; thriving and CA were combined)	264.94***	53	190.39***	5	5.00	0.11	0.18	0.72
One-factor model (EI, CA, thriving, and SP were combined)	271.46***	54	196.91***	6	5.03	0.11	0.18	0.71

Note: $N = 130$, after excluding three cases with missing data.

Abbreviations: CA, career adaptability; EI, emotional intelligence; SP, safety performance.

* $p < .05$, and *** $p < .001$.

TABLE 2 Means, standard deviations, and correlations.

Variables	Mean	SD	1	2	3	4	5	6
1. Gender	0.98	0.15						
2. Age	28.74	4.11	.00					
3. Job tenure (months)	39.24	41.74	.00	.66**				
4. Emotional intelligence	3.88	0.50	-.02	-.17	-.17			
5. Career adaptability	3.88	0.69	-.05	-.25**	-.22*	.67**		
6. Thriving	3.99	0.60	.07	.24**	-.28**	.50**	.54**	
7. Safety performance	4.32	0.72	.03	-.06	-.03	.25**	.20*	.30**

Note: $N = 127$. We implemented listwise deletion. Gender: male = 1; female = 0.

* $p < .05$, and ** $p < .01$.

Hypothesis testing

The results of regression analyses are presented in Table 3. Demographic variables including age, gender, and tenure were controlled in all analyses. As reported in Table 3, EI was positively related to thriving (Model 1: $\beta = .45, p < .001$). Thus, Hypothesis 1 was supported.

Hypothesis 2 proposed that thriving would have a positive impact on individuals' safety performance. In Model 2, we added thriving into the regression, and the coefficient for the effect of thriving on safety performance was significant (Model 2: $\beta = .24, p < .05$). As such, Hypothesis 2 was supported.

Next, we used Hayes' (2014) PROCESS for SPSS to test the mediating effect of thriving on the relationship between EI and safety performance. We employed 5000 bootstrap samples with a 95% bias-corrected confidence interval (CI) to test the indirect effect. The results showed a significant indirect effect of EI on safety performance via thriving ($\beta = .11, B = .16, \text{Boot SE} = 0.07, 95\% \text{CI} = [0.03, 0.30]$), demonstrating that thriving mediated the relationship between EI and safety performance. Therefore, Hypothesis 3 was supported.

Hypothesis 4 predicted that career adaptability would moderate the relationship between EI and thriving. We applied a three-step hierarchical regression to analyze the potential moderating effect. As shown in Table 4, control variables (age, gender, and tenure) were entered in Step 1 and EI and career adaptability were entered in Step 2. The interaction term of EI and career adaptability was entered in Step 3. To reduce the potential multicollinearity, both EI and career adaptability were mean-centered before calculating the interaction and before their entry into the regression equation. The results showed that the interaction effect of EI and career adaptability on thriving was significant ($\beta = .25, p < .01$), which suggested that the moderating role of career adaptability potentially existed. To further explore the direction of moderation, we depicted the moderating effect of career adaptability by adopting Dawson's (2014) procedure. Specifically, we plotted the effect of EI on thriving one standard deviation below and

TABLE 3 Results of the mediation model (Hypotheses 1, 2, and 3).

Dependent variables	Thriving		Safety performance	
	(Model 1)		(Model 2)	
Gender	.08		.01	
Age	-.05		-.04	
Job tenure (months)	-.17		.09	
Emotional intelligence (EI)	.45***		.14	
Thriving			.24*	
R^2	.28		.11	
$df1, df2$	4, 122		5, 121	
F	12.27***		2.95*	
Indirect effect (bootstrap)	β	B	SE	95%CI
$EI \rightarrow thriving \rightarrow safety\ performance$.11	.16	0.07	[0.03, 0.30]

Note: $N = 127$. We implemented listwise deletion and reported standardized (β) coefficients in Models 1 and 2. Bootstrap samples = 5000.

Abbreviation: CI, confidence interval.

* $p < .05$, ** $p < .01$, and *** $p < .001$.

TABLE 4 Results of the moderating effect (Hypothesis 4).

	Thriving		
	Step 1	Step 2	Step 3
Gender	.07	.09	.09
Age	-.09	-.00	.01
Job tenure (months)	-.22	-.16	-.14
Emotional intelligence (EI)		.23*	.24*
Career adaptability		.35***	.44***
EI × Career adaptability			.25**
R^2	.09	.35***	.40***
ΔR^2		.26***	.05**

Note: $N = 127$. We implemented listwise deletion and reported standardized coefficients in this table.

* $p < .05$, ** $p < .01$, and *** $p < .001$.

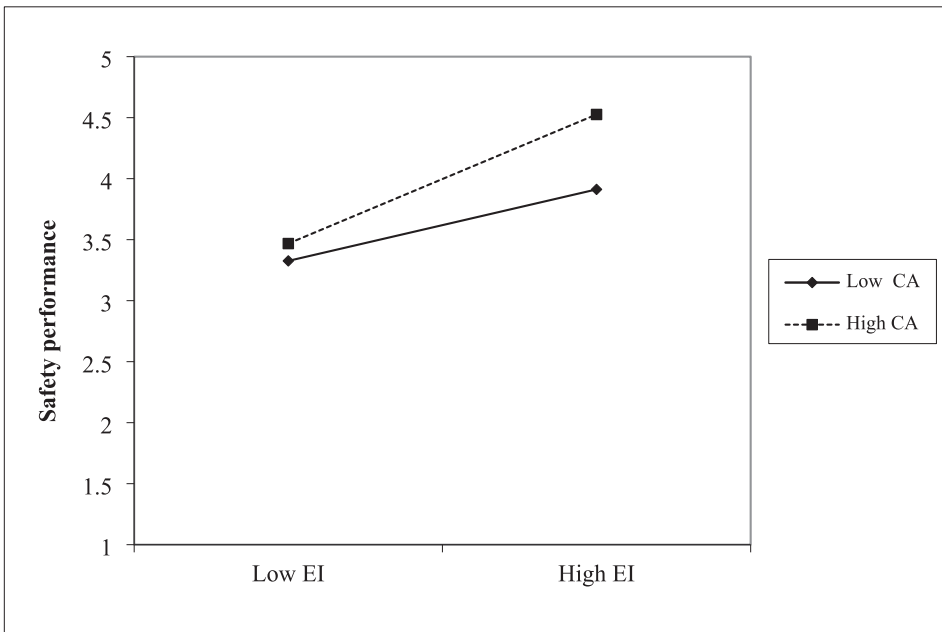


FIGURE 2 The moderating effect of career adaptability on the relationship between emotional intelligence and thriving at work.

above the mean of career adaptability (Figure 2) and calculated the simple slopes. The simple slope analysis demonstrated that the relationship between EI and thriving was stronger when career adaptability was high (slope = 0.43, $p < .001$) rather than low (slope = 0.16, $n.s.$). These results supported Hypothesis 4.

Hypothesis 5 expected that career adaptability would moderate the mediating effect of thriving on the relationship between EI and safety performance. In detail, the mediated relationship (i.e., the indirect effect of EI on safety performance via thriving) would be stronger for

individuals with higher level career adaptability. To examine this moderated mediation hypothesis, we employed Model 74 in PROCESS for SPSS (Hayes, 2014) with 5000 bootstrap samples to assess the indirect effects of EI at higher and lower levels of career adaptability. Based on our results (Table 5), the indirect effect of EI on safety performance via thriving was positive and significant when career adaptability was high ($\beta = .09, B = .12, \text{boot SE} = 0.07, 95\% \text{ CI} = [0.01, 0.29]$) but not significant when career adaptability was low ($\beta = .03, B = .05, \text{Boot SE} = 0.06, 95\% \text{ CI} = [-0.04, 0.20]$). [Correction added on 14 September 2023, after first online publication: Citation of Table 5 has been added in the preceding sentence in this version]. This result appeared to support our prediction that the indirect effect would be stronger when career adaptability was higher. However, the index of moderated mediation suggested that the difference between these two conditional indirect effects was not significant (index = 0.07, SE = 0.06, 95% CI = [-0.04, 0.16]). Accordingly, Hypothesis 5 was only marginally supported.

Due to the self-report nature of safety performance, we also conducted analyses to check if these results were impacted by social desirability. These analyses showed that when social desirability was controlled, the indirect effect of EI on safety performance via thriving was significant ($\beta = .11, B = .15, \text{Boot SE} = 0.07, 95\% \text{ CI} = [0.04, 0.29]$). This indirect effect was significant when career adaptability was high ($\beta = .08, B = .12, \text{Boot SE} = 0.07, 95\% \text{ CI} = [0.01, 0.27]$) but not significant when career adaptability was low ($\beta = .03, B = .04, \text{Boot SE} = 0.06, 95\% \text{ CI} = [-0.04, 0.19]$). The index of moderated mediation was not significant (index = 0.07, SE = 0.06, 95% CI = [-0.05, 0.16]). Therefore, our results remained the same no matter whether social desirability was controlled or not, suggesting that social desirability was less likely to be a concern in our study.

Additional analysis

We conducted a set of additional analyses in which the two dimensions of safety performance (i.e., safety compliance and safety participation) were analyzed separately. The results remained similar to when overall safety performance was the focal dependent variable. Both indirect effects of EI on safety compliance ($\beta = .09, B = .14, \text{Boot SE} = 0.07, 95\% \text{ CI} = [0.03, 0.35]$) and safety participation ($\beta = .12, B = .18, \text{Boot SE} = 0.07, 95\% \text{ CI} = [0.07, 0.38]$) via thriving were significant. The conditional indirect effect of EI on safety compliance via thriving was significant when career adaptability was high ($\beta = .07, B = .11, \text{Boot SE} = 0.07, 95\% \text{ CI} = [0.004, 0.27]$) but was not significant when career adaptability was low ($\beta = .03, B = .04, \text{Boot SE} = 0.12, 95\% \text{ CI} = [-0.04, 0.19]$). Similarly, the conditional indirect effect of EI on safety participation via thriving was significant at high ($\beta = .10, B = .14, \text{Boot SE} = 0.08, 95\% \text{ CI} = [0.02,$

TABLE 5 Results of moderated mediation effects (Hypothesis 5).

	β	<i>B</i>	Boot SE	95% CI
<i>EI</i> → thriving → safety performance				
Low career adaptability	.03	.05	0.06	[-0.04, 0.20]
High career adaptability	.09	.12	0.07	[0.01, 0.29]

Note: Bootstrap samples = 5000. Standardized (β) and unstandardized (*B*) coefficients are reported. Low and high career adaptability equals 1 standard deviation below and above the average of career adaptability, respectively. Index of moderated mediation = 0.07, Boot SE = 0.06, 95% CI = [-0.04, 0.16].

Abbreviation: CI, confidence interval.

0.31]), but not significant at low ($\beta = .04$, $B = .05$, Boot SE = 0.07, 95%CI = [-0.05, 0.24]), levels of career adaptability. However, the index of moderated mediation was significant neither for safety compliance (index = 0.06, SE = 0.05, 95%CI = [-0.04, 0.16]) nor for safety participation (index = 0.08, SE = 0.07, 95%CI = [-0.06, 0.18]). As such, our results were consistent no matter whether the focus was on overall, or the two dimensions of, safety performance.

DISCUSSION

The current research used a sample of full-time commercial pilots in China to explore the relationships among EI, thriving, career adaptability, and safety performance. The results showed that thriving mediated the positive relationship between EI and safety performance. That is, emotional competencies facilitate individuals in maintaining energy and processing information in their surroundings (e.g., learning) to thrive at work, and in turn, thriving individuals are more likely to perform their core tasks better and also voluntarily participate in work-related activities in a safety context. In addition, the results demonstrated that the positive effect of EI on employee thriving was strengthened by career adaptability, as was the indirect effect of EI on safety performance through thriving. These findings extend the existing literature on safety performance in notable ways and provide important implications for practitioners.

Theoretical implications

This research adds to the literature in several ways. First, by revealing the mediating effect of employee thriving (e.g., feeling energetic and learning new things), this study extends the understanding of the process through which EI can facilitate an individual's safety performance. The identification of employee thriving as a new mechanism reveals that the effect of EI on safety performance occurs through a pathway wherein cognition and affect coexist, given that thriving is a combinative complex of cognitive (learning) and affective (vitality) components (Spreitzer et al., 2005). In doing so, this research is also among the earliest to provide empirical evidence that supports the function of EI in fostering employees' thriving experience while also bridging the gaps in prior safety literature where the role of thriving is a missing area.

According to our findings, in safety-critical work settings, EI first contributes positively to the development of thriving experiences. With a sense of thriving fostered by EI, individuals are likely to follow safety procedures and participate in building a safety culture or environment. These findings are largely consistent with, while not directly outlined in, a socially embedded model of thriving (Spreitzer et al., 2005), which highlights that personal resources (e.g., affective resources) can promote individual thriving, and they are also in accordance with the thriving model of human growth (Spreitzer & Porath, 2014), which emphasizes thriving as an antecedent of individual performance. On the one hand, the present findings imply that emotional management skills (e.g., EI) equip airplane pilots with the capability to keep and restore affective energy and the ability to cognitively process new information in their surrounding contexts (e.g., regulation and use of emotional cues), thereby fueling themselves with nutrients for a sense of thriving (vitality/energy and learning). Also taking into account the socially embedded model of thriving (Spreitzer et al., 2005), there is a possibility that EI triggers their agentic behaviors (e.g., exploration, task focus, and heedful relating) to facilitate energy

acquisition/restoration and learning process as a path leading to a thriving state. On the other hand, the results to some extent reflect that thriving, as a positive psychological status, can not only provide energy for individuals to maintain a professional attitude toward work but also enable them to learn what needs to be done to perform tasks in a more efficient and productive way. That means that an individual's sustained vitality (energy) and learning together contribute to his or her positive work outcomes (e.g., safety performance).

Second, by examining career adaptability as a boundary condition on the strength of the effect of EI on thriving in the safety context, this study contributes to the socially embedded model of thriving (Spreitzer et al., 2005) by suggesting that personal resources can intertwine to enable employee thriving. The influence of EI on thriving varies with the level of career adaptability. Our results suggest that career adaptability enhances the effect of EI on thriving. A possible explanation is that career adaptability serves as a self-adaptation source to cultivate individuals to take full responsibility for their own growth in a safety-critical context. Under this internal stimulation, individuals are also driven to leverage their personal resources and strengths (e.g., EI) to behave agentically to pursue growth (Guan et al., 2014), such as focusing on their daily tasks, remaining curious and learning new things, maintaining good work relationships with colleagues, and seeking opportunities for further development (Spreitzer et al., 2005). These self-adaptation processes, elicited by the interplay of EI and career adaptability, may boost employees' emotional and cognitive information processing to form a positive cycle of regulation–adaptation to grow when needing to address safety-related issues and challenges at work. Consequently, emotionally intelligent individuals are more likely to experience higher levels of thriving when they are also vocationally adaptable, as manifested by their concern, curiosity, control, and confidence in professional contexts where safety is a priority.

Third, our findings show that the moderating effect of career adaptability might have the potential to extend to influence the indirect relationship between EI and safety performance via thriving. This moderated mediation perspective has offered a more complex, finer grained view of the influence of EI on safety performance by highlighting its mechanism and boundary condition. Specifically, the thriving-mediated mechanism exists only when individuals possess higher levels of career adaptability. It seems that thriving may not explain why or how safety performance is fostered by EI when individuals' career adaptability is low. Indeed, career adaptability reflects an individual's self-regulatory capability to maximize his/her potential to realize pre-set goals by implementing continuous active adaptation strategies (Johnston, 2018). High-level career adaptability individuals are aware and mindful of their own potential, and they are able to utilize their personal ability and resources (e.g., EI) to gain beneficial outcomes that keep them thriving when performing daily safety-related duties. Our findings suggest that these self-regulation-related characteristics of career adaptability may lead thriving to play a stronger role in translating the effect of EI to safety performance. However, these observations may only represent an emerging sign showing the possibility that career adaptability strengthens the mediating role of thriving in the relationship between EI and safety performance, given that our empirical results have not revealed a significant index of moderated mediation. With this emerging sign and to reach a more solid conclusion, future research might continue to verify these moderated mediation effects using a larger sample size, which, as per Aguinis (1995), may increase the chance of identifying moderating effects. Nonetheless, the partial support for our moderated mediation model reflects a successful theoretical and empirical integration of career construction theory (Savickas, 1997, 2002) and the socially embedded model of thriving (Spreitzer et al., 2005) to explain the complex process through which EI facilitates safety performance.

Practical implications

This study has important practical implications. Our findings indicate that EI and thriving are important predictors of an individual's safety performance, and EI can facilitate the development of employee thriving. These results suggest that to promote employees' compliance with and participation in safety-related behaviors, managers should endeavor to enhance employees' EI when it is feasible and to create a workplace where employees can thrive. One way might be to introduce EI-enhancement training courses for those employees who are deemed to possess low levels of EI, for previous research shows that EI can be improved by a targeted training program (Mattingly & Kraiger, 2019). Improving employees' EI may be an efficient but cost-effective strategy to improve safety performance and consequently reduce costs caused by the violation of safety-related procedures. In addition, attention should be paid to employees' sense of thriving, which, as per the results of the present study, can also enhance their safety performance. Although the present findings highlight that the development of a thriving experience can benefit from a higher level of EI, past research has shown that thriving can also be stimulated by creating more positive work environments characterized by, for example, an open information-sharing environment and improved civility in the workplace (Spreitzer et al., 2012). Thus, it would be helpful for managers to pay attention to strategies that can help shape these environmental characteristics in order to promote workplace thriving. Furthermore, the present study finds that career adaptability strengthens the positive effect of EI on safety performance via employee thriving. That means that career adaptability can accelerate the functions of EI in enabling thriving and thus in promoting safety performance. From this perspective, managers can also consider integrating elements that target career adaptability enhancement into the training programs. By incorporating both components of EI and career adaptability, these programs should be more effective in ensuring employees' thriving and safer behaviors.

Limitations and future research directions and strengths

This study has several limitations that future research could further explore. First, although the participants answered in a two-wave survey, there is still a concern regarding common method bias. Although the independent variable, EI, was collected at Time 1, employee thriving and safety performance were collected at the same time point (Time 2). As such, the relationship between thriving and safety performance may have been subject to common method bias. However, since our CFA results showed the four-factor model to have a better fit than the one-factor model and the three-factor model, in which thriving and safety performance were combined, the concern of common method bias is reduced. Nonetheless, future research should consider collecting three-wave data. Relatedly, our mediation was tested via data collected at two time points (e.g., thriving and safety performance were both collected at Time 2), which limited our conclusion about the causality among EI, thriving, and safety performance. However, our ad hoc analysis showed that the indirect effect of EI on thriving via safety performance was not significant, which further consolidated our confidence in the mediating role of thriving between EI and safety performance. Nonetheless, future research may adopt a more rigorous longitudinal research design with repeated measures collected through three time points to examine the relationship between these variables.

Second, we used self-report measures to assess individuals' safety performance. Although this scale has been widely used to measure safety performance and has proven to have high reliability and validity (Xia et al., 2017), self-report measures may suffer from respondents' inclination to give overly positive responses (Van de Mortel, 2008). Considering that safety performance is critical in some safety-centered industries, more objective approaches such as observer ratings may provide advantages in evaluating individual performances more accurately. Future research may also consider applying supervisor ratings and accessing employee safety records to develop a comprehensive view of individuals' safety performances.

Third, we focused on the moderating effect of career adaptability at the personal level and empirically neglected the moderating role of the context. Indeed, the present research suggests that some situational and contextual factors at the organizational level can interact with EI to influence work outcomes (Desti & Shanthi, 2015). For example, exposure to a negative emotional climate (referring to predominant emotions that were perceived by group members) is likely to cause stress, which can result in occupational cognitive failure that in turn can lead to incidents. In such situations, individuals may activate their EI to conquer the adverse effects and maintain a positive mental status to focus on their tasks and avoid failure. At the workplace, job stress, which stems from job demands or other requirements (heavy workload, time pressure, work relationship, etc.), can also result in distraction, lost attention, cognitive processing failures, and a high possibility of making errors and mistakes (Barney & Elias, 2010; Jamal, 2007). When job stress increases, emotionally intelligent individuals should be able to seize the information in the changing situation and take active steps to control the potential adverse effects on his/her performance. Future research may consider boundary conditions at the organization level to identify factors that strengthen or weaken the effect of EI on safety performance.

Fourth, our study only examined the mediation effect of thriving in the relationship between EI and safety performance. Previous research indicates that the relationship between EI and performance tends to be indirect (Ingram et al., 2019). Thriving might not be the only mediator between EI and safety performance. Earlier research suggests that EI can shape an individual's ability to process situational information and influence positive psychological states that contribute to desirable results at work (e.g., Sunindijo & Zou, 2013). It might be worthwhile for future research to explore other mediation mechanisms, such as burnout, safety motivation, and mindfulness, as well as the associated boundary conditions.

Finally, our sample size was relatively small, and the participants were from the commercial aviation industry. A large portion of commercial pilots are employed in the general aviation industry, and they would share some common characteristics with commercial aviation while working in different flying environments. For example, the pilots may have graduated from the same flight training school, leading to the same educational background, but those working in the general aviation industry may operate unscheduled flights and, in many cases, work for much smaller airlines. Further research may consider collecting samples from these two different areas of the aviation industry and comparing the results to explore whether there are differences regarding the influence of EI on safety performance.

CONCLUSION

Based on the socially embedded thriving theory, we established a moderating mediation model to examine the influence of EI on safety performance through thriving, with a boundary

condition of career adaptability. Our results support that EI is an important enabler of thriving that can improve safety-related behaviors, and the effect of EI is enhanced when career adaptability is high. This study makes significant contributions to the safety literature at the workplace by introducing the thriving-based mechanism to further our understanding of how the benefits of EI can be enhanced by personal resources (career adaptability) so as to promote thriving and improve safety performance. From a practical perspective, our findings suggest that organizations may provide EI and career adaptability training programs to enable their employees to thrive and thereby enhance safety performance.

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CONFLICT OF INTEREST STATEMENT

There is no conflict of interest to disclose.

DATA AVAILABILITY STATEMENT

Data are not available due to privacy/ethical restrictions.

ETHICS STATEMENT

Ethical approval for this study was obtained from the institution of the lead author.

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