



# Group leader emotional intelligence and group performance: a multilevel perspective

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## Abstract

Drawing from the IPO (Input–Process–Output) model, this study adopted a multi-level framework to investigate the dynamic mediating mechanisms that link group leader emotional intelligence (EI) with group performance. Based on a sample of 64 group leaders and 194 group members, this research applied multilevel structural equation modeling (SEM) and explored two mechanisms, namely group cohesion at the group level and person–group fit at the individual level in the relationship. Results revealed that group leader EI could improve group performance through enhancing group-level cohesion. At the individual level, it showed that group leader EI positively affected P-G fit. The paper utilized and expanded the IPO framework to explain the relationship between group leader EI and group performance from a multilevel perspective. Practical and theoretical implications are discussed.

**Keywords** Leadership · Emotional intelligence · Group performance · Group cohesion · Person–group fit · Multilevel SEM analysis

## Introduction

As teamwork becomes increasingly important in contemporary organizations, scholarly interest in performance is undergoing a shift from individual performance to group performance (De Jong et al. 2016; Schaubroeck et al. 2011). On the other hand, with the increase of work complexity and interdependency, practitioners have also become increasingly aware of the fact that group outcomes are determined not only by people' cognitive abilities (e.g., expertise) and skills (e.g., technical skills), but also by their emotional intelligence (EI) (Rausch et al. 2011; Ashraf and Khan

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2014) which can be broadly defined as abilities to identify, process and manage one's own and others' emotions (Lopes et al. 2004). Often assuming the central role of a group, a leader's EI could be an essential influencing factor in building high-performing groups (Chang et al. 2011; Van Kleef et al. 2009; Walter and Humphrey 2011). Our study joins the conversation by exploring how leader EI could build high-performing groups.

Substantial research has explored issue of leader EI (Jin et al. 2012; Wong and Law 2002). Although research on leader EI and performance has passed many milestones, we argue two critical limits still exist in the literature. First, extant studies dominantly focused on work outcomes at a single level (O'Boyle et al. 2011). The important cross-level process remains unclear (Chang et al. 2011; Hur et al. 2011). This void is striking because research has shown that leadership is a cross-level process (Chen et al. 2011); thus, a narrow focus at a single level risks missing the opportunity to explain a large proportion of group-level variances. Second, studies that focus on the mechanisms linking leader EI with group performance are largely unsystematic, such that the theoretical argument often lacks an overarching theoretical framework. Given the dearth of cross-level research on how leaders recognize and manage emotions in themselves and in others in the group context, this study aims to contribute to closing the void. In this study, we build on the classic IPO (Input–Process–Output) framework (Hackman 1987; Marks et al. 2001) to examine the complex cross-level interplay within groups. Specifically, this research explores the underlying dynamic mechanisms as the group processes linking group inputs (group leader EI) and group outcomes (group performance). We also empirically examine the multilevel mediations, including group cohesion at the group level and person-group fit (P-G fit) at the individual level (Marks et al. 2001), to account for the influence of leader EI on group performance in a more detailed and coherent way.

Therefore, this study aspires to make three contributions. First, with a growing body of research on the leadership–group performance relationship, recent literature has urged for the investigation of the underlying mechanisms that explains this relationship (Cho et al. 2019; Hu and Luo 2020; Rezvani et al. 2016; Wilderom et al. 2015). Applying the classical IPO model (Hackman 1987), we provide a more complete picture that clarifies this relationship. Our study takes a first step in investigating how specific leader quality, EI, has cross-level influence in the team process and thus promises to provide important implications for leadership literature. Second, our research contributes to the work on group cohesion by exploring its function as a group-level facilitator that connects group supervisor and group outcomes. Unveiling group cohesion as both antecedents and outcomes from a multi-level perspective, the present research expands the research territory of group cohesion and positions it into a broader research community of group supervisor EI and group outcome linkage. Third, the study extends the P-G fit literature by filling the voids in understanding the antecedents of P-G fit.



## Theory and hypotheses development

The IPO framework is widely employed in group effectiveness research (Langfred 2007; Mathieu et al. 2000, 2006). This framework offers a theoretical structure to delineate a causal chain of group inputs, processes, and outcomes (Hackman 1987). Input factors usually include the group starting conditions, such as group size (Amazon and Sapienza 1997), task type (Stewart and Barrick 2000), group leader behavior (Cole et al. 2011; Shen et al. 2012), and the group's knowledge, skills, and abilities (KSAs) (Krumm et al. 2013). Group processes focus on how groups achieve their goals and social interaction among group members (Carmeli et al. 2011). The process variables encompass group members' affective reactions or emotional responses, as well as behavioral responses (Jackson et al. 2003). Group outcomes include performance indicators, such as decision quality and group effectiveness (Shemla et al. 2016).

Among these various antecedents that can influence group performance, two focal roles in a group, the group leader and the group member, as well as their interaction, are the key factors that fundamentally impact the performance (De Hoogh et al. 2015; Pieterse et al. 2013). Effective leadership requires not only analytical intelligence but also emotional intelligence (Wilderom et al. 2015). As discussed, although the positive association between group leader EI and group performance has been acknowledged and researched (De Hoogh et al. 2015), there has not been sufficient details in the literature describing how exactly they are linked. In other words, the mechanisms underlying this relationship are unclear.

### Group leader EI

Conceptually, the advancement of EI literature has been accompanied by debates around its conceptual clarity (Bar-On and Parker 2000) and external validity. While critics of EI argued that the concept is too good to be falsifiable (Mayer et al. 2001), we restrict our conceptualization of EI as a set of cognitive capacities. We made this decision with care and have based our decision on three grounds. First, EI as cognitive capacities has been well accepted (Lopes et al. 2004; Wong and Law 2002). In previous studies, the reliability and validity of the measurement have been supported, attesting to the empirical rigor of this approach. Second, by limiting our definition of EI to cognitive capacities, we set clear boundaries of what EI entails in our studies, and subsequently, measure leaders' EI according to the definition. In this way, we hope to avoid the "redundancy" problem of other EI conceptualizations. Third, by connecting the cognitive capacities of being emotionally intelligent to the behaviors in teams, as measured by performance, we attempt to contribute to the EI literature by connecting the cognitive capacities to the behavioral outcomes, showing the "internal" connection among the EI construct (Mayer et al. 2001).

With this conceptualization, we argue that group leader EI is a key group input resource (Burke et al. 2006). EI consists of four categories: perception, appraisal, and expression of emotion; emotional facilitation of thinking; understanding,



analyzing and employing emotional knowledge; and reflective regulation of emotions to further emotional and intellectual growth (Mayer 1997). All four categories of skills and capacities may constitute important resources for a group to perform.

### **Dual-process: group-level cohesion and individual-level P-G fit**

Based on the IPO model (Hackman 1987), groups' internal interactional processes unfold at both the individual level and the group level (Humphrey and Aime 2014). At the group level, group leader EI influences group performance by shaping the interactive dynamics between the leader and members (Chang et al. 2011). A group leader with high EI, meaning that he or she has high ability of appraisal, expression, regulation, and utilization of emotion, can better stimulate group members' positive emotions and more effectively manage group members' negative emotions so that the emotional atmosphere within the group will be improved (Chang et al. 2011). This increased group emotional morale enhances group commitment and trust, and bond the group to be in unity, in other words, to enhance group cohesion at the group level (Offermann et al. 2004). Similarly, at the individual level, leader EI reflects leaders' ability to understand and managing the nature of both job requirements and group members' traits, which jointly comprise the P-G fit (Hollenbeck et al. 2002).

Drawing upon the IPO model (Hackman 1987), group cohesion and P-G fit are selected because they both represent the group process, yet at different levels. Our study aims to explore how group leader EI can influence group performance by affecting group process or within-group dynamics, rather than simply through affecting group members. Group activities are dynamic, rather than static, phenomena that are replete with interactions both among group members and between group members and the group leader (Beersma et al. 2003). Group cohesion, which is defined as task commitment and interpersonal attraction to the group (Carron and Brawley 2000), represents the group process and dynamics at the group level; whereas P-G fit, which focuses on the interpersonal compatibility between individuals and their work groups and adapts the supplementary fit perspective about values consistency (Kristof-Brown et al. 2014), represents the group process and dynamics at the individual level. Thus, group cohesion and P-G fit are taken into account in our model to captures the group process at both group and individual levels, respectively.

### **Group cohesion at the group level**

Drawing on the social learning theory (Bandura and Walters 1977), we propose that group cohesion, as a group process construct, plays a mediating role between leader EI and group performance at the group level for two reasons. First, as an essential group input, group leaders with high EI are more likely to foster positive interactive dynamics among group members, and to enhance the coordination and cooperation within a group, i.e., group process improvement, in other words, making the group more cohesive (Sy et al. 2005). Second, social learning theory (Bandura and Walters 1977) points out that individuals make their behaviors and values consistent



with role models by observing and imitating their role models, i.e., the leader in the group context. For group leaders with high EI, their effective management of emotions will permeate their daily management activities, thus contributing to the reduction of group interpersonal conflicts as well as the promotion of group cohesion, and, eventually the improvement of group performance.

Group cohesion is the tendency for a group to be in unity when working towards a goal or to satisfy the emotional needs of its members (Brahm and Kunze 2012). Research has identified three key antecedents leading to group cohesion-attraction, group pride and task commitment (Salas et al. 2015). Specifically, two critical aspects are heightened in the literature of *attraction* to be conducive to group cohesion: group members' attraction to the group, and their desires to maintain in the group (Michalisin et al. 2007). In addition, group pride provides a sense of "us" in such a way that group cohesion is improved (Owen 1985). And task commitment facilitates group cohesion through bonding group members together to accomplish their mutual tasks or goals (Yukelson et al. 1984). All these antecedents require a leader's ability and intelligence in providing employees with emotional support and regulating employees' emotions while harmonizing members into a harmonious group (Wang 2015).

Leader EI indicates a leader's ability of appraisal, expression, regulation, and utilization of emotion (Salovey and Mayer 1989). High EI, therefore, reflects a leader's ability to manage effectively not only his/her own emotional status, but also his/her subordinates', i.e., group members' emotional status (George 2000). Social learning theory shows that direct experience or indirect experience is conducive to learning, and indirect learning is carried out by observing the behavior and results of others (Bandura and Walters 1977). In a group, the leader plays a role modeling through which the followers will conduct a series of social learning and psychological matching processes, including observation, learning, imitation, and identification. More importantly, through this role modeling, the followers know which behaviors are expected, rewarded, or punished by the leader (Feng et al. 2018). Through interaction with high emotional intelligence leaders, group members will gradually learn how to effectively understand and express themselves in daily work, become proficient in managing emotions, and thus easily integrate into the group by showing authentic feelings and trust to other members. Mutual attraction and emotional harmony between members promote group cohesion and cooperation among group members to jointly complete specific group tasks.

Besides, leadership is frequently considered as a significant indicator of group input that can influence the group process (Cole et al. 2011; Martins et al. 2004) in the IPO model (Hackman 1987). As an essential component of leadership, we expect leader EI to exert a great effect on the group process. If a group leader is skilled in monitoring and managing the group members' emotional status, at the group level, s/he is more likely to foster group members' positive feelings toward one another and toward the whole group, while effectively managing the possible conflicts among group members (Bono et al. 2007; Chang et al. 2011). Similarly, leadership research found that a group member will have strong commitment and satisfaction to the group if the group leader provides proper psychological benefits (Jia et al. 2020; Zhang et al. 2019, in press), such as approval, respect, esteem,



and affection (Jacobs 1970). In line with this rationale, Sy et al. (2005) demonstrated that a group leader's EI has a positive influence on the interactive dynamics among group followers, so that the group followers will be better coordinated, cooperated, and bonded together. Therefore, the following is proposed:

**Hypothesis 1** Group leader EI is positively related to group cohesion.

By providing support to group members' feelings of self-worth, a group leader would positively impact the group members' performance (Dansereau et al. 1995). A large body of literature considered emotions in the workplace as a commodity provided by the employees in exchange for individual rewards (Morris and Feldman 1996; Sutton 1991; Sutton and Rafaeli 1988). In other words, the better group members' emotion is managed by the group leader, the more likely the group members will be productive. While the current literature has clearly demonstrated that group leader EI is positively related to group success, a vital missing link is the mechanism through which the group leader EI transforms into the group output (Boyatzis et al. 2008).

Based on the IPO framework (Hackman 1987), group process has been demonstrated to be an important driver of group affective and behavioral consequences (Marks et al. 2001; Mathieu et al. 2000). Group cohesion, as an indicator of group process (Bae et al. 2010; Powell et al. 2004), is regarded as highly important because it can facilitate group functioning, encourage extra-role behaviors, decrease employees' fluctuation (Wiesenfeld et al. 1999) and enhance group performance (Beal et al. 2003). Thus, drawing on the IPO model (Hackman 1987), we propose that group cohesion plays a mediating role between leader EI and group performance for the following reasons.

First, high EI leaders are more likely to trust others and to take the right actions, such as sharing experience, providing support, and giving encouragement, to improve workplace cohesiveness (Mayer et al. 2008). When a high cohesive relationship and atmosphere within a group is created, this positive emotional tone within the group will increase group members' trust to each other, which in turn, leads to group performance enhancement (Chang et al. 2011; Shamir et al. 1993). Second, group leader EI is found to function as a buffer to alleviate group members' negative impact from bad emotions, while also serving as a facilitator to stimulate members' positive impact from good emotions (Chang et al. 2011, p. 80). Research on cross-functional group performance points out that the internal environment of the group positively influences group effectiveness through cohesion (Daspit et al. 2013). In summary, leader EI induces group performance through group cohesion by stimulating positive feelings of group identity, setting group norms, and encouraging group members to engage in emotional expressions (Wilderom et al. 2015). This leads to our second hypothesis.

**Hypothesis 2** Group cohesion mediates the relationship between group leader's EI and group performance at the group level.



### P-G fit at the individual level

Adapting person–environment (P–E) fit perspective (Caplan 1987), we suggest that P-G fit plays a mediating role between leader EI and group performance at the individual-level. P-G fit refers to the consistent characteristics or complementary needs between individuals and groups, which could promote the formation of a close relationship (Piasentin and Chapman 2007). Group leaders with high EI can improve the group performance through improving P-G fit because they can use positive emotions to promote the realization of group functions, accurately evaluate employees' feelings, and use this information to affect employees' emotions so that they understand and support the group goals (Cavazotte et al. 2012).

P–E fit is derived from the theories about the interaction between the individual and the environment (Caplan 1987). Among P–E fit categories (e.g., person-job fit, person-profession fit and person-superior fit), P-G fit is especially important for our case here as it focuses on the interaction between members and their groups (Kristof-Brown et al. 2014). In a turbulent and uncertain external environment, organizational operations increasingly rely on teamwork, and many work goals need interpersonal interactions among group members to be successfully achieved (Tung and Lin 2015).

To establish and maintain a high level of P-G fit demands a group leader who could recognize personality differences among the group members, to understand clearly the characteristics of the group as a whole, and to maintain a good match among the idiosyncrasies of the group members (Chang et al. 2011). Psychologists categorize these characteristics into traits and abilities (Costa and McCrae 1992). Matching the people with the role where each group member's cognitive and ability could be maximally utilized requires a group leader to deeply understand and effectively manage not only the group members' ability, but also their emotional status (Bohrer 2007). Similarly, positioning each group member in a role that best fits his or her personal traits require a group leader's knowledge of the job's both physical and emotional requirements, and of the group member's emotional traits (Wong & Law, 2002). All of the above tasks that improve P-G fit require a group leader's strong capacity of understanding, appraisal, regulation, utilization, and management of emotion, i.e., a group leader's EI. Therefore, the third hypothesis is proposed:

**Hypothesis 3** Group leader EI is positively related to P-G fit.

While we propose that at the individual level, a group leader's EI would influence P-G fit, research found that internal fit in a group would affect the overall performance (Hollenbeck 2000). From the P–E fit perspective (Caplan 1987), the misalignment of internal fit would neutralize the positive performance. Therefore, P-G fit, as a critical internal group process, can be expected to impact group performance.

When there is a high fit between individuals and the group, the group members are easier to show initiative behavior, which is beneficial to the organization





(Swider et al. 2015), because, in this scenario, the group members' intrinsic motivation is inspired (Teo et al. 2016). According to the self-consistency theory, when individuals realize that their behavior is important and necessary to the group or organization, they will automatically show behavior that is consistent with their value (Wu et al. 2016). High P-G fit group members will closely combine their own destiny with their group and have psychology ownership of the group (Firfiray and Mayo 2016), and further behave to protect the interest of groups, which in turn, improve the group effectiveness (Astakhova 2016).

Group leaders with high EI are more likely to deeply understand and effectively manage group members' emotional traits and abilities as well as the emotional traits and abilities that the job position requires, and therefore to deliver not only a good fit between group members and the group in traits and abilities, but also a good match between the job requirements and the group members' characteristics (Wong and Law 2002). Meaning that facilitated by an emotionally positive and supportive group leader, group members will more agree with other group members' value, the group job's value, and the group's shared value. Drawn upon the P-E fit perspective (Caplan 1987), group members in this status will feel more involved with other group members, the job, and the group as a whole, and therefore, are more willing to cooperate with other members, and to contribute to the group "in constructive ways" (Cable and DeRue 2002, p. 877), which in turn, would improve their group performance.

On the basis of the IPO framework (Hackman 1987), we expect that at the individual-level, group leaders' EI (group input) can enhance the group performance (group outcome) through stimulating the P-G fit (group process). Specifically, we hypothesize the following:

**Hypothesis 4** P-G fit mediates the relationship between group leader EI and group performance.

A summary of our theoretical model is shown in Fig. 1.

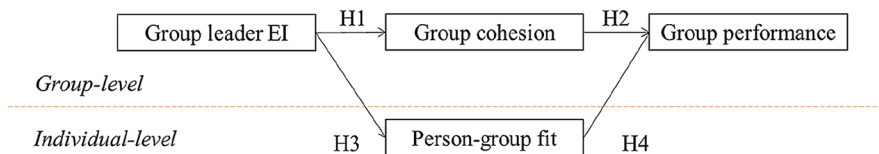


Fig. 1 Theoretical model





## Method

### Participants and procedures

The hypotheses were tested by collecting data from 64 groups in different organizations from various industries using a convenience sampling method in the region of Taiwan. Three researchers randomly recruited 100 teams to participate in our study through convenience sampling method. Managers and at least two group members per group took part in this research. As this study aims to capture a broad range of organizations to represent different types of organizations, we selected sample from different industries. In addition, the convenience sampling method satisfied the requirements of probability sampling, which improved the generalizability of our results (Kitchenham and Pflieger 2002). The manager's survey contained demographic information, group performance. Subordinates received similar surveys, which requested them to assess their own group-person fit and demographic information. Participants were assured confidentiality, anonymity and voluntary participation.

Based on convenient sampling, we received 64 group leaders and 197 subordinates' responses (yielding a response rate of 64% and 39.4% respectively). The sample consisted of 67.9% male group leaders and 52.4% male subordinates. The average recruited group size is 3.31 (out of 8). 2 to 6 members out of 8 members in a group took part in our research ( $SD = 0.79$ ). The average subordinates' group tenure was 3 years ( $SD = 1.52$ ).

### Measure

We strictly followed the translation and back-translation procedure proposed by Brislin (1986). Specifically, we first invited two bilingual researchers in management to translate the questionnaires from English into Chinese. Second, the questionnaires were back-translated into English by another two bilingual researchers. Third, we compared the back-translated version with the original version. For the discrepancy, we organized all researchers to discuss and finalize the translations based on the procedure suggested by Jones et al. (2001). All variables, excluding the demographic variables, were measured by 7-point Likert-scale from 1 = *strongly disagree* to 7 = *strongly agree*. The specific variables are described below, along with Cronbach alpha coefficients that suggest satisfactory reliability of the scales. As mentioned above, both supervisor and subordinates rated surveys. Supervisors report data on group performance and group information, including group size and leaders' group tenure. Subordinates report data on P-G fit, group cohesion and group leader EI.



## Group member survey

**P-G fit** We measured P-G fit with 3 items from Cable and DeRue (2002), which reflect the compatibility between individuals and their groups. The subordinates of the group rated their agreements with these statements. The three items are “The things that I value in life are very similar to the things that my group values”, “My personal values match my group’s values and culture,” and “My group’s values and culture provide a good fit with the things that I value in life.” The Cronbach’s alpha for this scale was 0.92.

**Group cohesion** We measured group cohesion with 5 items scale from Price (1972), which measures group members’ task commitment and interpersonal attraction to the group. Subordinates were asked to indicate their agreement to the given statements. A sample item is “How well do members of your group get along with each other?” The data demonstrated sufficient inter member agreement and reliability to justify aggregation to the group level ( $r_{wg} = 0.30$ , ICC1 = 0.26, ICC2 = 0.52), which is sufficient for data aggregation (Zhou et al. 2012). Therefore, group cohesion was operationalized as the mean of members’ responses. The Cronbach’s alpha for this scale was 0.99.

**Group leader EI** We measured group leader EI with 16 items adapted from Wong and Law (2002), which reflect group members’ perception of their leaders’ capacity of understanding, monitoring, and utilizing their own emotions. The subordinates rated their agreement with the 16 statements. A sample item is “The leader is able to control his/her temper and handle difficulties rationally”. The Cronbach’s alpha for this scale was 0.97.

## Group leader survey

**Group performance** We measured group performance by using 5 items adapted from Tjosvold (1988), which capture to what extent their group accomplished the group goals and the group operational performance. Supervisors provided ratings of their group’s performance. A sample item is “our group accomplished our goals well”. The Cronbach’s alpha for this scale was 0.95.

**Control variables** Our control variables include group size and leaders’ group tenure based on previous research about group performance (Zhang et al. 2012). The reasons are as follows: compared to big groups, the small sizes of the group may make it easier to observe group leader behaviors in rich detail (Garg and Eisenhardt 2017). In other words, the influence of group leaders on the subordinates may depend partly on the size of the group. Thus, we controlled for group size. In addition, in the interaction between leaders and group members, the role of familiarity cannot be ignored (Green et al. 1996). Therefore, in order to partial out the potential familiar effect, we controlled for leaders’ group tenure.



## Analysis strategy

The present data contained a hierarchical structure in which responses of individual-level variables were nested within groups. Therefore, we adopted multilevel SEM framework to estimate the hypothesized multilevel relationships using Mplus 7.11 (Muthén and Muthén 2010; Preacher et al. 2010). Specifically, because we have relative small sample size at within level. Therefore, mean of all variables are used under multilevel-SEM framework. For the cross-level mediation tests, we used joint significant test suggested by MacKinnon et al. (2002), which has been proven to have superior statistical power than the traditional Baron and Kenny (1986)'s methodology for investigating the mediation effect. In addition, following Preacher and Selig (2012)'s recommendation, Monte Carlo Simulation bootstrap method, which is more practical than bias-corrected bootstrap in testing mediation effects for multi-level modeling, was used to avoid any problems of non-normal distribution of product term in estimating confidential interval of the indirect effect.

## Results

Means, standard deviations, and bivariate correlations among studied variables from received 64 group leaders and 197 subordinates are reported in Table 1. As we expected group leader EI is positively related to P-G fit and group cohesion. In addition, P-G fit and group cohesion is positively related to group performance, respectively.

## Confirmatory factor analysis

The proposed four factor model shows a good fit with the data ( $\chi^2(113) = 233.98$ ,  $p = 0.000$ , CFI = 0.96, TLI = 0.95, RMSEA = 0.08). Testing for discriminant validity requires that constructs with similar attributes be combined. This enables

**Table 1** Means, standard deviations, and bivariate correlations among studied variables

Variable	Means	ISDs	TSDs	1	2	3	4	5
1 Group performance	5.10	–	0.85	(0.95)				
2 Group cohesion	3.85	0.55	0.47	0.40**	(0.99)	0.39***	0.49***	
3 Person-group fit	4.50	0.98	0.62	0.52***	0.87***	(0.92)	0.46***	
4 Group leader EI	4.88	0.82	0.75	0.31*	0.57***	.70***	(0.97)	
5 Group size	6.64	–	6.66	0.06	–0.03	–0.08	–0.01	
6 Leader group tenure	28.57	–	36.29	0.06	–0.16	–0.18	0.17	–0.1

$N = 197$  for group member level variables.  $N = 64$  for group leader level. Below diagonal: Team level; above diagonal: individual level. Internal consistency coefficients, Cronbach's alphas, are reported in the parentheses on the diagonal. ISDs indicates standard deviation at individual level; TSDs indicates standard deviation at group level

\* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$



estimation of a three factor model. Since both group cohesion and P-G fit are used to evaluate employees' relationship with group, these constructs were combined. The three-factor model indicated a poor model fit to the data,  $\chi^2 (116) = 534.20, p = 0.000, CFI = 0.85, TLI = 0.82, RMSEA = 0.14$ . Comparison between the four and three factor model using a  $\chi^2$  difference test revealed that the four-factor model had a significantly better fit to the data ( $\Delta\chi^2 (3) = 300.22, p = 0.000$ ). Based on the above evidence we conclude that the model variables have good discriminant validity and that the four-factor model is superior. In addition, the convergent validity of latent factors in our model was supported by their factor loadings. Specifically, all factor loadings of were all statistically significant and of considerable magnitude (Group performance, range from 0.80 to 0.93; Group cohesion, range from 0.76 to 0.89; P-G fit, range from 0.74 to 0.87; Group leader EI, range from 0.74 to 0.93). The standardized factor loadings for the measurement model based on CFA have been presented in the Appendix B.

**Main effect**

To estimate the hypothesized model (see Fig. 1), we separated the between and within variance for all variables at individual and group level. For hypothesis 1, the cross-level direct effects of group leader EI ( $\beta = 0.56, \gamma = 0.35, p = 0.000$ ) on group cohesion was positive. In addition, as shown in Table 2 the cross-level direct effects of group leader EI ( $\beta = 0.70, \gamma = 0.57, p = 0.000$ ) on the P-G fit was positive. Therefore, hypothesis 1 and 3 were supported.

**Table 2** Results of hypothesized model

DV	Group cohesion			Person-group fit			Group performance		
	$\beta$	<i>B</i>	<i>M</i> (SE)	$\beta$	<i>B</i>	<i>M</i> (SE)	$\beta$	<i>B</i>	<i>M</i> (SE)
Control									
Group size	-0.01	0.00	0.00	-0.06	-0.01	0.01	0.08	0.01	0.01
Leader group tenure	-0.10	0.00	0.00	-0.11	0.00	0.00	0.16	0.00	0.00
Mediators									
Group cohesion							0.25*	0.44*	0.22
Person-group fit							0.45	0.62	0.42
IV									
Group leader EI	0.56**	0.35**	0.11	0.7**	0.57**	0.19	-0.13	-0.15	0.27
<i>R</i> <sup>2</sup>		0.25*			0.33*			0.52**	

*N* = 194 for group member level variables. *N* = 64 for group leader level variables. *SE* standard error. *β* indicates standardized and unstandardized path coefficient respectively

\**p* < 0.05, \*\**p* < 0.01, \*\*\**p* < 0.001



### Mediation effect

For hypothesis 2 and 4, we hypothesized group cohesion (H2) and P-G fit (H4) mediated the relationship between group leader EI and group performance at the individual and the group level respectively. The Monte Carlo Simulation bootstrap analysis with 20,000 draws provided estimates of mediation effects and a confidence interval. At the group level, the mediation effect from group leader EI on group performance through group cohesion was  $\gamma=0.16$  ( $\beta=0.14, p=0.049$ ) with a 95% bias-corrected bootstrap confidence interval that was entirely above zero (0.001, 0.37). The mediation effect from group leader EI on group performance through P-G fit was  $\gamma=0.35$  ( $\beta=0.31, p=0.162$ ) with a 95% bias-corrected bootstrap confidence interval that contained zero (-0.11, 0.98). These results supported hypothesis 2 but did not support hypothesis 4.

A summary of the results of our theoretical model is shown in Fig. 2.

### Discussion

Two mediating mechanisms—group cohesion (at the group level) and P-G fit (at the individual level)—that link group leader EI to group performance were examined. Results revealed that group-level cohesion mediated the impact of group leader EI on group performance. At the individual level, it showed that group leader EI positively affected P-G fit, yet the mediation effect of P-G fit could not be found.

### Theoretical implications

The findings in the present study have three important theoretical contributions. First, based on the well-noted IPO structure (Hackman 1987), this research explores the underlying dynamic mechanism linking group input (i.e., group leader EI) and group outcome (i.e., group performance). Our research provides important implications for leadership research by showing how a leader’s EI has cross-level influence in the team process. This is theoretically important because prior research in leadership has taken a comprehensive approach to study

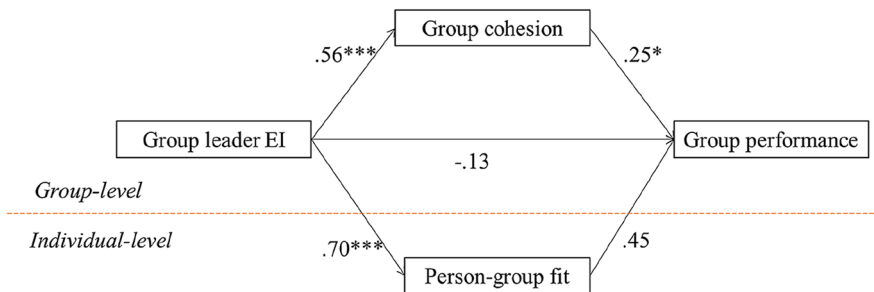


Fig. 2 Results of the theoretical model



leadership (see for instance, the critic of transformational leadership by Van Knippenberg and Sitkin (2013)). Our study takes a first step in teasing out how specific leader quality influences leadership effectiveness. With a burgeoning body of literature studying the relationship between leadership and group performance (Chang et al. 2011; Koman and Wolff 2008), recent literature has urged for the investigation of the underlying mechanisms that explain this relationship (Lorinkova and Perry 2019; Rezvani et al. 2016; Wilderom et al. 2015). Applying the IPO framework, by differentiating the two-level group process of group-level cohesion and individual level P-G fit, this study depicted a complete picture of how the effects of group leader EI transfer to the group members, and eventually to the group performance. Specifically, at the group level, we revealed that group cohesion mediates the effect of group leader EI on group performance, which opens insightful avenues that expend the research territory by positioning group cohesion into a broader research community of manager's EI and performance linkage (Bass et al. 2003). At the individual level, although we failed to find an mediation effect of P-G fit in this relationship, we were able to contribute to the P-G fit literature, which will be discussed later.

Second, by demonstrating the group-level mediating role of group cohesion, the study advanced the knowledge of the dynamic function of group cohesion in influencing group activities. Organizational success often depends on groups' ability to work together and perform consistently (Bass et al. 2003; Beal et al. 2003; Mach et al. 2010; Mathieu et al. 2015). Group cohesion has been shown to be a potent driver of group performance (Beal et al. 2003). Consistent with our findings, previous research has also demonstrated the mediating role of group cohesion in the relationship between leadership and group outcomes. For example, Wilderom et al. (2015)'s research reveals that store cohesiveness mediates the relationship between the manager's EI and store performance. In line with this stream of literature, our findings extend this body of research by providing scholars who are interested in exploring the effects of group leader EI a fresh insight to understand the mechanisms of how leader EI affects group performance at the group level.

Third, the study contributed to the growing body of P-G fit literature by narrowing the gap in understanding the antecedents of P-G fit in the group context. Our results made an important departure from previous research by considering P-G fit from an emotional perspective (Guan et al. 2011; Kristof-Brown et al. 2005; Pierro et al. 2015). However, the mediating role of P-G fit was not found. A possible interpretation could be that a group member's P-G fit includes not only the interplay among and between group members and the leader, but also the match between group members and the group task (Boon et al. 2011). However, group leaders in Chinese context are usually not involved in either the group member recruit, nor the group task selection; in other words, both the group members and the group tasks are given (Lau et al. 2002; Schaubroeck et al. 2007). Thus, a group leader in this context cannot influence the match between group members and the group task. Therefore, although a group leader can influence group members' P-G fit, a group leader may not be able to influence group performance through the P-G fit.



## Managerial implications

The findings have three critical managerial implications for practitioners. First, as the study revealed a positive relationship between group leader EI and group performance, we suggest that organizations should pay special attention to the cultivation of group leader's EI, especially in the industries where the managers are generally promoted from technical roles and are not necessarily well trained for interpersonal management and EI monitor (Antonakis et al. 2009; Castillo and Del Valle 2017). For example, organizations are suggested to develop leader EI through both selection and training processes. On the one hand, EI tests could be included in the selection process to better identify high EI candidates. On the other hand, training programs that aim to improve junior managers' mastery of managing emotions might serve as a tipping point to improve the group management effectiveness.

Second, the findings demonstrated a group-level mediating role of group cohesion that links group leader EI and group performance, suggesting that group leader EI would significantly impact how group members co-operate with each other and therefore, would influence the ultimate group performance. This finding urges managers to observe the group cohesion attentively, especially in the context where the accomplishment of jobs requires a high level of cooperation and interdependence (Beersma et al. 2003; Bradley et al. 2014). Meanwhile, team-building programs and activities that would foster group cohesion could serve as a supplementary way to help group leaders achieve greater group performance.

Third, at the individual level, finding a positive relationship between group leader EI and P-G fit suggests organizations, in the staffing process, to consider and develop group managers' abilities and skills of emotional management, so that the interpersonal compatibility between the individuals and their work groups can be improve, and group members' capacity and traits can be maximally utilized in the role (Pieterse et al. 2013).

## Limitations and future research directions

Several limitations of this study that could point to future research directions should be acknowledged. First, regarding the research design, although our participants came from a wide range of originations and industries, the survey was distributed in a single region, Taiwan, which may cause cautions in generalizing its results. Future studies could benefit from increasing both the demographic diversity and the population.

The second limitation comes from the threat of causality and common method bias in our model (Jiang et al. 2012). While mediational models are inherently causal and there are critiques of using cross-sectional data to investigate mediation effect (e.g., Stone-Romero and Rosopa 2004), attempting to test mediation with cross-sectional data is fairly common in management research (Zhang et al. 2012). Although we used group supervisors rather than group members to report the group performance, and our measures came from two sources, we only had informant-reported





measures and cross-sectional designs, which may cause common method bias. In addition, some previous research showed that P-G fit could lead to group cohesion (De Cooman et al. 2016), which is another alternative to interpreting this relationship. Thus, future research would be improved through using objective information and adopting longitudinal studies to either replicate our results or explore other alternatives to extend our model (Fan et al. 2014; Zhang et al. 2016).

Finally, the present research failed to find the individual-level mediating role of P-G fit underlying the relationships between group leader EI and group performance. This model is limited by the impossibility of adopting all other individual-level factors that potentially mediate or moderate this relationship, which in turn, limits our contribution of exploring the interplay between those variables at the individual level (Fan et al. 2014). Future research could benefit from exploring other potential individual-level mediators connecting the group leader's EI and group outcomes, as well as other possible moderators of this relationship.

## Conclusion

Given the increasing work complexity and interdependency in contemporary organizations, group leader EI that fosters effective group management becomes crucial. In the present study, we adopted a multilevel SEM analysis to explore the dynamic mechanisms linking group leader EI and group performance from a multilevel perspective using the IPO model. The findings extend prior research on group cohesion by exploring its function as a group-level facilitator that connects group supervisor and group outcomes. We also complement and extend the P-G fit literature by narrowing the gap in understanding its antecedents from a bottom-up perspective. The results have critical implications for group management research.

## Appendix

See Tables 3 and 4.

**Table 3** Demographic information of group, leader and member

Demographic information	
Team-related	
Average group size	3.08 members
Average leaders' tenure	3.73 years
Leader-related	
Male group leaders	44 leaders
Female group leaders	20 leaders
Member-related	
Male group members	103 members
Female group members	94 members



**Table 4** Standardized factor loadings for the measurement model

	GP	GC	PGF	GLEI
GP1	0.87***			
GP2	0.89***			
GP3	0.93***			
GP4	0.80***			
GP5	0.82***			
GC1		0.76***		
GC2		0.93***		
GC3		0.89***		
PGF1			0.74***	
PGF2			0.83***	
PGF3			0.83***	
PGF4			0.87***	
PGF5			0.85***	
GLEI1				0.89***
GLEI2				0.93***
GLEI3				0.74***
GLEI4				0.89***
Factor variances	1.00	1.00	1.00	1.00
Composite reliability	0.94	0.90	0.92	0.92
Average variance extracted (AVE)	0.74	0.75	0.68	0.75
Average squared variance (ASE)	0.06	0.28	0.24	0.28
Maximum squared variance (MSV)	0.08	0.47	0.33	0.47

GP Group performance, GC Group cohesion, PGF Person-group fit, GLEI Group leader EI

\* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$

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## Compliance with ethical standards

**Conflict of interest** All authors declare that they have no conflict of interest.

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