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Collective efficacy as a mediator between cooperative group norms and group positive affect and team creativity

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Abstract In spite of a growing body of research on creativity in team contexts, very few researchers have paid attention to the team-level antecedents and mediating processes of team creativity. To fill this gap, drawing on social cognitive theory and Dzindolet's group creativity process model, this study examined cooperative group norms and group positive affect as antecedents of team creativity and explored collective efficacy as an intermediary mechanism between these relationships. The current study was conducted with 97 work teams from 12 different South Korean organizations. As predicted, the results demonstrated that cooperative group norms and group positive affect were positively associated with team creativity, and that collective efficacy mediated these relationships. The findings offer theoretical and practical implications regarding the creativity of work teams.

Keywords Team creativity · Cooperative group norms · Group positive affect · Collective efficacy

Creativity in the workplace is the one of most widely researched topics in the organizational behavior literature. In today's intensively competitive and rapidly changing business environment, creativity is increasingly important because it can promote organizations' competitive advantages to ensure their survival (Amabile, 1996). In response to changes in the business environment, many organizations have adopted a

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team-based structure. In an effort to identify factors contributing to the creativity of work teams, scholars have investigated team-level characteristics such as diversity in team composition (Ancona & Caldwell, 1992, Perretti & Negro, 2007; Watson, Kumar, & Michaelsen, 1993), collaboration and communication (Mitchell, Boyle, & Nicholas, 2009), cohesion (Hoegl & Gemuenden, 2001; Hülsheger, Anderson, & Salgado, 2009), group climate (Hülsheger et al., 2009; Pirola-Merlo & Mann, 2004) and leadership (Jaussi & Dionne, 2003; Zhang, Tsui, & Wang, 2011).

While the described research has provided meaningful insights into factors fostering team creativity, very few studies have examined the effects of team members' characteristics and contextual factors on team creativity simultaneously (Shin, Kim, Lee, & Bian, 2012; Shin & Zhou, 2007). This is a critical omission from a theoretical standpoint. Social cognitive theory states that personal agency and social structure operate interdependently to affect human activities (Bandura, 1986, 1997). Drawing on this theory, the simultaneous investigation of team member variables and contextual factors is crucial to the understanding of team creativity. In a similar vein, Paulus and Dzindolet (2008) assumed that personal and situational variables significantly and jointly predict creativity at the individual and team levels (Paulus & Dzindolet, 2008). Accordingly, we aim to explore the simultaneous effects of team members' characteristics and contextual factors on team creativity. More specifically, we identify cooperative group[1] norms and group positive affect as key contextual and team member variables affecting team creativity, respectively.

Social cognitive theory posits that cognitive, affective, and other personal factors, as well as environmental factors serve as interacting determinants of human behavior (Bandura, 1997). Among environmental factors, social norms are considered a crucial factor that determines human activities. Norms, structure, and sociostructural practices surrounding individuals impose constraints as well as offer resources and opportunities for human adaptation and change (Bandura, 2000). Drawing on this theory, norms related to cooperation and teamwork in a team context should operate as a precondition for team creativity. In particular, cooperative group norms are increasingly important in team contexts because they can develop into a behavioral pattern by which tasks are completed cooperatively. Given that pooling together members' knowledge and ideas is critical to generating creative outputs, group norms regarding teamwork and coordination of team member resources and efforts should be considered a key contextual factor of team creativity (Paulus, Dzindolet, & Kohn, 2012).

Social cognitive theory also proposes affective factors as determinants of human behavior. That is, individuals' emotional experiences in their surroundings affect their actions and functioning. According to social cognitive theory, emotional arousal influences efficacy beliefs, which serves as a basis for motivation (Bandura, 1997; Gist, 1987). Building on this logic, we attend to the role of group positive affect in predicting team creativity. Although very little, prior research has demonstrated a positive association between group positive affect and team creativity (e.g., George & King, 2007; Shin, 2014; Tsai, Chi, Grandey, & Fung, 2012). Based on these findings, we isolate group positive affect as a critical team member variable that enhances team creativity.

[1] In this study, we use the terms "team" and "group" interchangeably.

We further propose collective efficacy as a crucial intermediary process that intervenes the relationships between cooperative group norms and group positive affect and team creativity. Bandura (1997) extended the notion of human agency to collective agency and theorized that collective efficacy operates as the foundation for the motivation and performance of a group. Collective efficacy is defined as group members' shared belief in the group's collective capabilities to achieve specific outcomes (Bandura, 1997). Given that group members with high collective efficacy tend to explore new perspectives and procedures (Gibson & Earley, 2007; Zhang et al., 2011), collective efficacy is a plausible intermediate process between team-level antecedents and team creativity.

In the team literature, a majority of studies have relied on the input-process-output (IPO) model to explain how team process variables function as mediators between antecedents and consequences (e.g., Hülsheger et al., 2009; Ilgen, Hollenbeck, Johnson, & Jundt, 2005; Salas, Stagl, & Burke, 2004; West & Anderson, 1996). Applying the IPO model to the domain of creativity, Paulus and Dzindolet (2008) proposed a model of group creativity as a theoretical framework for delineating how input factors influence group creativity. The group creativity model is an elaborate variation of the IPO model in that it addresses specific input and process variables that can contribute to group creativity. On the contrary, the IPO model is used for understanding more general group processes and performance. For this reason, in this study, we adopt Paulus and Dzindolet's group creativity model as an overarching framework for our research propositions.

We believe that our investigation of the mediating role of collective efficacy in team creativity can advance team creativity research in several ways. First of all, it is the first attempt to shed light on the mediating effect of collective efficacy on the relationship between cooperative group norms and team creativity. By proposing and testing exploratory mechanisms by which cooperative group norms promote team creativity, our study enriches the extant knowledge on the precursors of team creativity. Furthermore, our study contributes to research on affect and creativity by attending to the role of collective efficacy as a linking mechanism between group positive affect and team creativity. Although very few, prior studies have shown that collective processes, such as broadening-and-building interactions among members (Rhee, 2006) and team promotion focus and reflexivity (Shin, 2014), intervene the link between group positive affect and team creativity. In addition to these cognitive, motivational, and social processes, we propose collective efficacy as another meaningful mediator in the affect-creativity relationship at the team level.

In sum, the objectives of this study are to investigate the effects of cooperative group norms and group positive affect on team creativity and to examine the mediating effect of collective efficacy between those two key antecedents and team creativity based on relevant theoretical models. To achieve these research objectives, survey-based data were collected from the members and leader of 97 work teams in South Korea.

Theoretical framework and hypotheses

The IPO model postulates that input variables (i.e., team organization, norms, composition, leadership, size) influence team outcomes through processes such as use of

skills, strategies, coordination, potency, and compatibility (Hackman, 1987). These entire processes are affected by external demands and resources. Expanding and elaborating on the IPO framework, Paulus and Dzindolet (2008) categorized input factors of group creativity into four dimensions: group climate (psychological safety, conflict, and shared norms), group structure (diversity, size, and leadership styles), and group member variables (personality, knowledge, skills, abilities, and mood), and external demands (organizational structure, task structure, support, and reward). The systematic classification of input variables and the inclusion of external demands in input factors are the major differences between the IPO model and the group creativity model. Furthermore, Paulus and Dzindolet's model is distinct from the IPO model in that it isolates cognitive, motivational, and social processes as intermediary mechanisms leading to group creativity. Cognitive processes pertain to generating solutions by attending to others' ideas and combining and elaborating on previously generated ideas (Paulus & Dzindolet, 2008). Motivational processes refer to the use of internal and external motivators to reduce motivational losses (Paulus & Dzindolet, 2008). Social processes encompass sharing generated ideas, exchanging information, collaborative problem-solving, discussing varied viewpoints, and engaging in social comparison (Paulus & Dzindolet, 2008).

To our knowledge, there are only two empirical studies that adopted Paulus and Dzindolet's group creativity model as a theoretical framework. Shin and Eom (2014) identified team creative efficacy as a team member variable, transformational leadership as a team structure, and risk-taking norms as a team climate, and investigated the mediating role of team proactivity in translating the effects of the three antecedents on team creative performance. Their findings indicated that team creative efficacy and risk-taking norms significantly influenced team creative performance through the mediating process of team proactivity. On the other hand, Shin (2014) reported that the relationship between positive group affect and team creativity was mediated by team reflexivity (social-cognitive process) and team promotion focus (social-motivational process). Although these two studies were grounded in Paulus and Dzindolet's model, neither of them examined all four input dimensions. To fill this research gap, we measure the four input dimensions and include them in the data analysis. While we focus on cooperative group norms (group climate factor) and group positive affect (group member factor) as critical inputs for team creativity, we also measure team size and average team tenure (longevity) as group structure variables and functional areas as external demands and control them in the data analysis. We identify functional areas as key external demands in that they strongly affect task structures and reward systems (Song, Montoya-Weiss, & Schmidt, 1997). Therefore, our study is the first attempt to assess the effects of the four input dimensions in Paulus and Dzindolet's model.

Furthermore, unlike prior research based on Paulus and Dzindolet's model, we attend to the role of collective efficacy as a crucial linking mechanism between cooperative group norms and positive group affect and team creativity. Drawing on the proposition of social cognitive theory suggesting that collective efficacy is an impetus for motivation in teams (Bandura, 1997), we contend that collective efficacy creates interactive and synergistic dynamics necessary for team creativity (Bandura, 2001). Collective efficacy is a critical motivational state that prompts team members to work successfully and produce novel ideas and useful approaches.

Prior studies have largely focused on domain-specific efficacy (e.g., team creative efficacy) for anticipating team-level creativity in the workplace (e.g., Shin & Eom, 2014; Shin & Zhou, 2007). Creative self-efficacy is defined as the belief that one has the ability to produce creative outcomes (Tierney & Farmer, 2002). Scholars have proposed that general group efficacy predicted general group outcomes, whereas domain-specific efficacy is linked to specific group outcomes such as group creativity (Gibson & Earley, 2007; Gibson, Randel, & Earley, 2000; Tierney & Farmer, 2002). However, we argue that general collective efficacy can also enhance team creativity. This is because cooperative group norms and group positive affect are likely to influence general efficacy beliefs more strongly than domain-specific efficacy. Instead, domain-specific efficacy tends to be affected by task-related experience in the specific domain (Bandura, 1997; Tierney & Farmer, 2002). Because we focus on general group contextual and member factors as antecedents of team creativity, general collective efficacy should play a mediating role in these relationships. The proposed research model is depicted in Fig. 1 and each of the proposed relationships is explained in detail in the next sections.

Relationship between cooperative group norms and team creativity

Group norms are defined as shared standards and regular behavioral patterns expected by group members, which affect group members' perceptions, interaction styles, decision-making and problem-solving (Bettenhausen & Murnighan, 1991). In the subculture literature, norms within a team increase behavioral consistency among unit members and thereby drive them to exert collective effort to achieve common goals (O'Reilly, & Chatman, 1996). Group norms also function as an effective mechanism for controlling member behavior, such as anticipating, facilitating quickly, and responding appropriately (Hackman, 1992).

Norms have demonstrated inconsistent effects on creativity; controversially, some see a potential trade-off between norms and creativity (e.g., Goncalo & Staw, 2006; Nemeth & Staw, 1989). Some studies have shown that norms can foster team creativity by directing behavioral patterns and reducing uncertainty (Carmeli & Schaubroeck, 2007, Chatman & Flynn, 2001). On the contrary, other evidence suggests that norms negatively affect creativity by promoting conformity within a team, which disrupts individuals from thinking creatively (Goncalo & Staw, 2006; Nemeth & Kwan, 1985).

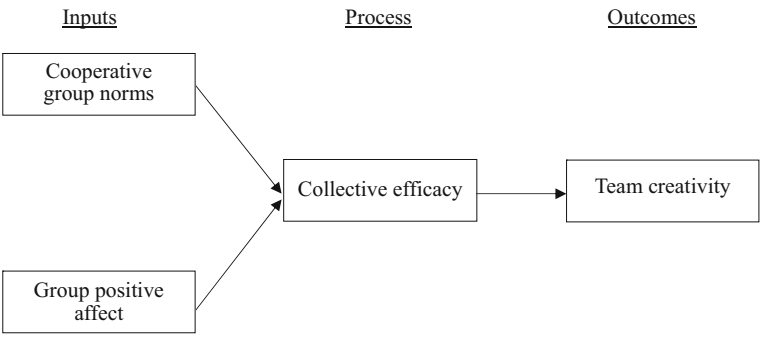


Fig. 1 The proposed research model

Due to such an inconsistency in prior findings, scholars have called for research investigating the effects of particular types of norms on team creativity (Goncalo & Staw, 2006; Kanter, 1988; Shin & Eom, 2014; Walton & Kemmelmeier, 2012). To answer this research call, we attend to cooperative group norms, which is one particular type of group norms that affect team processes and creativity.

Cooperative group norms are defined as norms that emphasize shared objectives, mutual interests, and commonalities among members (Chatman & Flynn, 2001). According to the competing value framework (Quinn & Rohrbaugh, 1983), cooperative values or norms are an important facet of the human relations culture because they encourage group members to perform their tasks cooperatively and interdependently with one another. Moreover, they lead members to commit themselves to sharing their knowledge and expertise and to building teamwork among one another. Cooperative norms shared within a team increase the frequency of interactions among members and provide opportunities to exchange relevant information, which prompts the members to generate creative ideas (Baer, Leenders, Oldham, & Vadera, 2010; Chatman & Flynn, 2001; Schepers & Van den Berg, 2007). For these reasons, cooperative group norms are postulated to be a pivotal input factor for team creativity.

Although virtually no research has tested the direct relationship between cooperative group norms and team creativity, scholars have steadily highlighted the effect of cooperation or collaboration on team creativity. For instance, Mitchell et al. (2009), evaluating 98 teams with diverse functions in organizations, found that team goals associated with cooperation positively predicted creativity outcomes, such as new-idea generation. Consistent with this finding, Drach-Zahavy and Somech (2001) found that collaboration, cooperation, and information-sharing were positively associated with team creativity. These findings verify that cooperation promotes open communication and interactions that contribute to team creativity. Building on the findings that norms for cooperation regularized team members' cooperative behavioral patterns, characterized by open communication and frequent interactions conducive to team creativity, it is hypothesized that:

Hypothesis 1 Cooperative group norms are positively related to team creativity.

Relationship between group positive affect and team creativity

Previous research on creativity has suggested positive affect to be a key personal factor that influences creativity at the individual level (Amabile, Barsade, Mueller, & Staw, 2005). Given the prevalence of team-based organizational structures in work environments, an increasing body of research has extended positive affect to the team or group level. Group positive affect is distinct from individuals' positive affect in that the former represents consistently positive affective reactions within a group (Barsade & Gibson, 2007; George, 1990). On the other hand, the latter pertains to an individual's relatively stable generalized tendency toward positive moods (Lazarus, 1991; Staw, Bell, & Clausen, 1986). Group positive affect emerges as a group-level phenomenon through social interactions and emotional contagion processes within a team (Barsada, 2002; George, 1990), thereby serving as a collective attribute of a team (Walter & Bruch, 2008).

Previous research has reported that group positive affect is associated with team members' collective involvement in creative activities, helping behavior, and task performance (Barsade, 2002; George, 1995; Grawitch, Munz, Elliott, & Mathis, 2003; Seong & Choi, 2014; Tsai et al., 2012). Drawing on the affect literature and the model of group creativity (Paulus & Dzindolet, 2008), we propose group positive affect as a critical input factor for group creativity.

Group positive affect positively relates to team creativity during interactions among team members by facilitating creative information processing (Chi, Chung, & Tsai, 2011; Rhee, 2007; Shin, 2014; Tsai et al., 2012). When a team displays a high level of positive affect, team members are prone to perceive their work environments as pleasant. Such a favorable emotional experience renders team members enjoy their interactions within teams, thereby motivating them to share their thoughts, debate their own opinions with other members, and generate additional options for solving problems (Gilson & Shalley, 2004; Shalley, Gilson, & Blum, 2009; Torrance, 1988). Furthermore, group positive affect can intensify team members' motivation to use creative and innovative processes to perform tasks. That is, when team members experience positive affect collectively during team interactions, it enhances their information-processing efficiency by encouraging them to link relevant information and use team discussions to develop novel ways for performing tasks (George & King, 2007; Tsai et al., 2012). It also increases cognitive flexibility (Isen, 1999), which in turn improves creative abilities, such as generating creative ideas, divergent thinking, and accepting new perspectives.

Similarly, in the broaden-and-build theory of positive emotions, Fredrickson (1998, 2001) theorized that individuals' positive emotion broadens the scope of their attention, cognition, and action, and builds physical, social and psychological resources. Her theory provides insights into the relationship between group positive affect and team creativity by postulating that positive affect broadens one's thought-action repertoire (Fredrickson, 2001). Group members who experience positive affect collectively are encouraged to broaden their thoughts and interact frequently. Such group-level affective dynamics, in turn, can enhance members' cognitive flexibility and willingness to consider diverse perspectives, which lead to more creative activities (Brown & Paulus, 2002; Fredrickson, 2001; Fredrickson & Joiner, 2002; Paulus & Yang, 2000). Specifically, broadened thoughts and actions spur team members to move outside their routine behavioral repertoires and to explore divergent thoughts in creative ways (Fredrickson, 1998). Taken together, group positive affect is posited to promote team creativity by facilitating team members' creative information processing and expanding their thoughts and actions. Therefore, we predict the following relationship:

Hypothesis 2 Group positive affect is positively related to team creativity.

Collective efficacy as a mediating mechanism

Collective efficacy is a sense of collective competence shared among team members with respect to responding to specific situational demands and allocating, coordinating, and integrating their resources (Zaccaro, Blair, Peterson, & Zazanis, 1995). Collective efficacy is thus not only a collective sense of team members' capabilities, but also the perception of collective coordination and integration during team interactions to perform a team task.

Self-efficacy refers to individuals' expectations of their ability to perform a task well and is known as a strong motivator in the workplace (Gibson & Earley, 2007). Unlike self-efficacy, collective efficacy is derived from social interactions among team members, through which they build collective beliefs in the group's ability to execute group tasks. Collective efficacy emerges in a collective process wherein group members persist in their efforts, decide on the direction of the goal, and adjust the intensity of coordination (Chen & Kanfer, 2006).

Recent research has examined collective efficacy as a mediator between team-level inputs and creativity (e.g., Zhang et al., 2011). For instance, Zhang et al. (2011) investigated the mediating effect of collective efficacy on the relationship between a team's structural factor (i.e., leadership) and team creativity. Yet, research on the mediating effect of collective efficacy for team climate and member variables is lacking. Drawing on social cognitive theory (Bandura, 1986) and Gibson and Earley's (2007) proposition that factors such as group characteristics and task contexts can shape collective efficacy, we identify collective efficacy as a key intermediary process linking group member variables (i.e., group positive affect) and contextual factors (i.e., cooperative group norms) and team creativity.

Collective efficacy stimulates team members to generate novel ideas and explore useful perspectives for solving problems, which promotes group creativity (Zhang et al., 2011). When collective efficacy is high, team members are willing to explore alternatives with new approaches, facets and procedures (Gibson & Earley, 2007). Empirical findings have demonstrated that team members' collective beliefs in their competence are related to team creativity (Zhang et al., 2011). During interactions among team members, team members' shared beliefs in the creative confidence of the whole team can influence team creativity (Tierney & Farmer, 2002; Zhang et al., 2011). Furthermore, prior studies grounded in the IPO model has identified collective efficacy as a critical process that translates team-level input factors into team creativity (e.g., Zhang et al., 2011). Building on this proposition and prior findings, we examine the role of collective efficacy as an intervening mechanism between cooperative group norms and group positive affect and team creativity.

Relationship between cooperative group norms and collective efficacy

Cooperative group norms emphasize interdependence and cooperation necessary for performing common tasks (Chatman & Flynn, 2001; Wagner, 1995). We argue that cooperative group norms influence collective efficacy because they regulate members' behavioral patterns and govern future interactions, which strengthen collective confidence. Tasa, Taggar, and Seijts (2007) claimed that degree of cooperation is significantly related to team efficacy. Although they did not directly link cooperative group norms and collective efficacy, we postulate that cooperative group norms can enhance collective efficacy by shaping cooperative behavioral patterns, such as sharing resources and sacrificing self-interest for the benefit of the team. A high level of cooperation among team members increases the likelihood that the team members will share information and knowledge, which in turn increases their beliefs in the team's capabilities (Gibson & Manuel, 2003). Similarly, cooperative group norms provide team members with rules concerning how they interact with one another, which increase the group's confidence that it can accomplish a task successfully (Gibson &

Earley, 2007; Lester, Meglino, & Korsgaard, 2002). Therefore, we predict a positive association between cooperative group norms and collective efficacy.

In the creativity literature, scholars have proposed that efficacy beliefs are a strong motivator for creativity and innovation (Ford, 1996; Shin & Zhou, 2007). Bandura (1997) highlighted that self-efficacy can promote individuals' creative activities because it changes task-related attention, initiation, and substance; thus self-efficacy can help individuals enjoy creativity-relevant activities and maintain creativity in the workplace. Analogous to the ways self-efficacy affects creativity, collective efficacy also encourages team members to focus on task-related attraction; it facilitates idea generation and divergent thinking necessary for producing creative outputs, which are cognitive processes proposed in Paulus and Dzindolet's model. Tierney and Farmer (2004) reported on a Pygmalion process that influences creativity based on the expectations of supervisors and employees at the individual level. Expanding their findings to the team level, team members who share efficacy beliefs develop expectations about team capabilities to perform well on creative tasks, which motivate the team members to strive to fulfill those expectations. In this way, collective efficacy enhances team members' intrinsic motivation, a key motivational process in Paulus and Dzindolet's model. Finally, given that collective efficacy emerges through social comparison and validation of the perceptions of the team's competencies (Bandura, 1982), collective efficacy can facilitate social processes by encouraging information sharing, discussion of viewpoints and ideas, and collaborative problem-solving. Taken together, cooperative group norms are anticipated to develop collective beliefs about the team's capabilities to find creative solutions to a problem. Such heightened collective efficacy enhances team creativity through the interaction of the aforementioned cognitive, motivational, and social processes. Therefore, we put forth the following hypotheses:

Hypothesis 3 Cooperative group norms are positively related to collective efficacy.

Hypothesis 4 Collective efficacy mediates between cooperative group norms and team creativity.

Relationship between group positive affect and collective efficacy

The link between individuals' affect and self-efficacy has been well established in the efficacy literature (Gully, Incalcaterra, Joshi, & Beaubien, 2002; Isen, Daubman, & Nowicki, 1987). In line with these findings, information processing research suggests that people who feel good are likely to have more positive material at hand in memory (Nasby & Yando, 1982). As research on affect has shifted to the group level, many scholars have focused on group affect or affective tone as a group-level phenomenon (George, 1990; Kaplan, LaPort, & Waller, 2013; Seong & Choi, 2014; Tsai et al., 2012). Gibson and Earley (2007) contended that group positive affect or mood is a significant precursor of collective efficacy. Similarly, social cognitive theory holds that emotional arousal can enhance efficacy beliefs (Gist, 1987). In particular, group positive affect derived from an experience of past success provides team members with a high degree of certainty that they can accomplish goals in the future (Bandura, 1997; Gibson & Earley, 2007).

In addition, the affective-consistency perspective theorizes that individuals tend to maintain consistency among a variety of personal characteristics such as feelings, values, and attitudes (Yu, 2009). That is, group members' positive affect can influence collective efficacy perceptions in alignment with their affect because it reduces inconsistency between affective and cognitive components through cognitive adjustment (Seong & Choi, 2014). Thus, when team members experience positive affect collectively, they tend to hold optimistic perceptions about the team's capabilities. Based on this logic, we expect group positive affect to be positively associated with collective efficacy.

Moreover, according to the broaden-and-build theory of positive emotions (Fredrickson, 1998), group positive affect contributes to collective efficacy by increasing cognitive flexibility and confidence toward the team as a whole to facilitate interactions within the team. By sharing positive affect collectively, members expand their thought and action beyond their existing abilities, which results in positive perceptions about the team's capabilities to respond to specific demands. When team members share a high level of confidence about the overall competence and performance of the team, it becomes a source of energy to integrate, allocate, and coordinate the resources of all team members (Zaccaro et al., 1995) as well as facilitates cognitive, motivational, and social processes necessary for team creativity (Paulus & Dzindolet, 2008). Such optimistic beliefs about the team's coordination capabilities enable team members to generate novel ideas for solving problems (Zhang et al., 2011). Therefore, the following relationships are proposed:

Hypothesis 5 Group positive affect is positively related to collective efficacy.

Hypothesis 6 Collective efficacy mediates between group positive affect and team creativity.

Methods

Sample and procedures

The data for the present study were gathered from 12 South Korean companies,[2] diverse in size and industry: service (23 %), backing and financial service (10 %), manufacturing (14 %), and other (51 %). All the participating companies adopted a team-based structure. These companies were composed of functional divisions, which contained several work teams. Every work team possessed more than three members and one formal leader with a higher rank in the organizational hierarchy.

The human resource (HR) managers of the participating companies were asked to randomly select approximately 10 teams in their company and to distribute the team

[2] Because the respondents were nested in 12 companies, we checked the possibility that team members' responses varied among the 12 companies by using hierarchical linear modeling (HLM). The results of HLM showed no significant random effect in the null model (u_0=.00, p = n.s.), which suggests that team members' responses were not affected by organizational characteristics. Because the random effect in the null model was not significant, we could not proceed to perform HLM in our hypothesis testing.

leader survey to team leaders and the team member survey to the members of the participating teams. The team leader survey included items evaluating team creativity and demographic information. The team member survey contained items assessing cooperative group norms, group positive affect, collective efficacy as well as demographic information of the team members. When the questionnaires were completed, the leader and members of the participating teams directly returned them to the researchers in separate, sealed envelopes. This survey was carried out voluntarily, and participants were assured confidentiality and anonymity.

Of the 120 work teams contacted by the HR managers, 97 leaders agreed to participate, yielding a final sample of 97 leaders and 573 team members (response rate = 80 %). Each participating team consisted of one formal leader and more than three members. The average team size was 6.1 members (SD = 2.1), which represented 60 % of formal team members, based on official company registries. The average age of the team leaders was 46.2 years (SD = 5.5) and 14.4 % of the leaders were female. The leaders' average organizational tenure and average current team tenure were 17.8 years (SD = 7.5) and 3.8 years (SD = 4.9), respectively.

On average, there were 6.1 members in each team (SD = 2.1). The average age of the team members was 36.4 years (SD = 7.2), and 67.2 % of participating team members were male. Their average organizational tenure and average current team tenure were 9.3 years (SD = 7.6) and 2.7 years (SD = 2.8), respectively. Team members held diverse positions in the organizational hierarchy: entry level employee (24.6 %), first-level supervisor (19.9 %), manager (23.4 %), and senior manager (22.5 %). Their functional areas varied: planning/strategy/operations (32 %), human resource management (26 %), sales (17 %), finance/accounting (12 %), and research and development (R&D) (5 %).

Split-group design and data aggregation

To reduce the potential common method variance (CMV) derived from same-source measurement, we adopted a split-group design as recommended by Conway and Lance (2010) and Ostroff, Kinicki, and Clark (2002). That is, we randomly divided each team's members into two equal-sized subgroups: Subgroups A and B. In terms of size, these subgroups ranged between 2 and 6 members (excluding the team leader). Subgroup A provided data about cooperative group norms and group positive affect, whereas subgroup B rated the collective efficacy of the team. On the other hand, the team leader assessed team creativity.

Even though cooperative group norms and group positive affect are group-level constructs, we measured these variables using each subgroup members' responses. Therefore, we aggregated their responses to the group level. Based on the referent-shift consensus model, we measured cooperative group norms and collective efficacy by using group-referent items (Chan, 1998; Chen & Bliese, 2002). However, drawing on the affect literature (Shin, 2014; Tsai et al., 2012), we adopted the direct consensus model as a compositional model for group positive affect. Thus, we had team members report the degree of their own positive affect and then aggregated their responses to the team level. To assess the appropriateness of data aggregation, we calculated within-group agreement index (i.e., r_{wg}) and between-group variability (i.e., ICC(1) and ICC(2)). As reported below, all measures exhibited acceptable levels of within-group

agreement and between-group variability, which justifies the aggregation of individuals' ratings to the team level (Chen, Mathieu, & Bliese, 2004).

Measures

As stated above, while team members provided ratings of cooperative group norms, group positive affect, and collective efficacy, the team leader assessed the creativity of his or her team. All study variables were rated on a five-point Likert scale (1 = *strongly disagree*, 5 = *strongly agree*).

Cooperative group norms (Subgroup A) To measure cooperative group norms, we used four items (α = .81, r_{wg} = .86, ICC(1) = .27, ICC(2) = .64, F = 2.77, p < .001) derived from Chatman and Fynn's (2001) cooperative group norms scales. Sample items included "It is important for us to maintain harmony within the team," "There is a high level of cooperation between team members," and "People are willing to sacrifice their self-interest for the benefit of the team."

Group positive affect (Subgroup A) Group positive affect was assessed by asking each team member to describe how he or she felt at the workplace using four items (α = .84, r_{wg} = .85, ICC(1) = .15, ICC(2) = .47, F = 1.87, p < .001) from the Positive and Negative Affect Schedule (Watson, Clark, & Tellegen, 1988). The team members' responses were aggregated to the team level in order to capture the overall emotional states in the team.

Collective efficacy (Subgroup B) Collective efficacy was measured with four items (α = .90, r_{wg} = .90, ICC(1) = .24, ICC(2) = .61, F = 2.57, p < .001) adopted from Jones's (1986) and Hoyt, Murphy, Halverson, and Watson's (2003) efficacy scales. The examples of the items were "Members of our team are confident that the team will be able to successfully perform its task," "Members of our team believe that the team has above-average ability," and "Members of our team feel confident that the team's skills and abilities excel those of other teams in the company."

Team creativity (Team Leader) The team leader rated the level of team creativity based on six items (α = .92) derived from Oldham and Cummings's (1996) creative performance scale and Zhou and George's (2001) creativity scale. Sample items were "Our team members' work is original and practical," "Our team members develop idea, methods, or products that are both original and useful to perform team tasks," and "Our team members generate creative ideas for solving problems."

Control variables In the present research, we controlled for several variables that may confound the relationships among the study variables. First, team creativity can be affected by group size (Curral, Forrester, Dawson, & West, 2001) because larger teams are more likely to have resources necessary for creative activities (Jehn & Bezrukova, 2004). Second, team structure factors such as time spent in the current team (average team tenure) can also influence team creativity (Shin & Zhou, 2007). Third, as a measure of external demands, functional areas were classified into five categories:

management, finance/accounting, sales/marketing, R&D, and others. Four dummy variables representing these five functional areas were used as control variables. In sum, team size, average team tenure, and four functional area dummy variables were controlled in all subsequent data analyses.

Results

To evaluate the discriminant validity of the study measures, a confirmatory factor analysis (CFA) was conducted for team members' ratings of cooperative group norms, group positive affect, and collective efficacy. The overall fit statistics for the hypothesized three-factor model indicated a good fit to the data (χ^2 (df = 51) = 228.22, $p < 0.001$, CFI = .95, RMSEA = .07). As reported in Table 1, our measurement model demonstrated a significantly better fit than alternative models ($\Delta\chi^2$ (df = 2) = 741.91, $p < .001$ for the two-factor model combining group positive affect and collective efficacy; $\Delta\chi^2$ (df = 2) = 757.69, $p < .001$ for the two-factor model combining group positive affect and cooperative group norms; $\Delta\chi^2$ (df = 2) =281.52, $p < 0.001$ for the two-factor model combining collective efficacy and cooperative group norms; $\Delta\chi^2$ (df = 3) = 1,101.72, $p < 0.001$ for the one factor model).

Table 2 presents the means, standard deviations, and correlations among all study variables. As expected, we detected significant associations between cooperative group norms and collective efficacy (r = .39, $p < .001$) and between group positive affect and collective efficacy (r = .36, $p < .001$). In addition, cooperative group norms (r = .34, $p <$ .01) and group positive affect (r = .40, $p < .001$) had a significant, positive relationship with team creativity.

Relationships between cooperative group norms and group positive affect and team creativity

Hypotheses 1 and 2 postulated the main effects of cooperative group norms and group positive affect on team creativity, respectively. To test these hypotheses, hierarchical regression analyses were performed. In the first step, team size, average team member

Table 1 Results of confirmatory factor analysis and chi-square difference tests

CFA models	χ^2	df	CFI	RMSEA	$\Delta\chi^2$	p-value of $\Delta\chi^2$
Model 0: Hypothesized three-factor model	228.22	51	.95	.07	–	–
Model 1: Two-factor model 1 (combining group positive affect and collective efficacy)	970.13	53	.76	.17	741.91	<.001
Model 2: Two-factor model 2 (combining group positive affect and cooperative group norms)	985.91	53	.76	.17	757.69	<.001
Model 3: Two-factor model 3 (combining collective efficacy and cooperative group norms)	509.74	53	.88	.12	281.52	<.001
Model 4: One-factor model	1,239.94	54	.69	.19	1,011.72	<.001

Table 2 Descriptive statistics and intercorrelations

	Mean	SD	1	2	3	4	5	6	7	8	9
1. Team size	6.09	2.19	–								
2. Team tenure	2.81	1.63	.01	–							
3. Functional area dummy - Management	.34	.47	.19†	.08	–						
4. Functional area dummy - Finance	.13	.33	−.03	.03	−.28**	–					
5. Functional area dummy - Sales	.18	.39	−.06	−.03†	−.34**	−.18	–				
6. Functional area dummy - R&D	.05	.22	.03	−.09	−.17†	−.09	−.11	–			
7. Cooperative group norms	3.43	.50	−.01	−.03	.07	.04	−.01	−.08	–		
8. Group positive affect	3.30	.57	−.10	.17†	−.01	.03	.05	−.09	.31**	–	
9. Collective efficacy	3.78	.50	.07	.14	.17	.05	−.11	.07	.39***	.36***	–
10. Team creativity	3.52	.51	−.08	.09	−.05	−.02	.02	.05	.34**	.40***	.37***

$N = 97$, † $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$

tenure, and the four dummy variables of functional areas (management, finance/accounting, sales, and R&D) were entered as control variables. In the second step, cooperative group norms and group positive affect were simultaneously entered. The results of these regression analyses are shown in Table 3. As predicted, both cooperative group norms ($\beta = .26$, $p < .05$) and group positive affect ($\beta = .24$, $p < .05$) were significantly associated with team creativity, supporting Hypotheses 1 and 2 (Model 4 in Table 3).

The mediation of collective efficacy between cooperative group norms and group positive affect and team creativity

Hypotheses 3, 4, 5, and 6 put forth the mediating effect of collective efficacy on the relationships between cooperative group norms and group positive affect and team creativity. To assess the main effect of cooperative group norms and group positive affect on collective efficacy, we conducted hierarchical regression analyses with the same procedures described above. As demonstrated in Model 2 in Table 3, both cooperative group norms ($\beta = .35$, $p < .01$) and group positive affect ($\beta = .21$, $p < .05$) were positively related to collective efficacy. These results lend support to Hypotheses 3 and 5.

Table 3 Results of hierarchical regression analyses of collective efficacy and team creativity

Dependent variable	Collective efficacy		Team creativity		
	Model 1	Model 2	Model 3	Model 4	Model 5
Step 1: Control variables					
Team size	.04 (.02)	.17 (12)	−.09 (.02)	−.06 (.02)	−.07 (.02)
Average team tenure	.13 (.03)	.08 (.15)	.11 (.03)	.08 (.03)	.06 (.03)
Functional area dummy - Management	.21 (.13)†	−.01 (.13)	−.05 (.13)	−.08 (.12)	−.12 (.12)
Functional area dummy - Finance	.12 (.17)	.17 (.21)†	−.04 (.17)	−.07 (.15)	−.09 (.15)
Functional area dummy - Sales	.01 (.15)	.07 (.02)	.01 (.15)	−.01 (.14)	−.01 (.13)
Functional area dummy - R&D	.13 (24)	.11 (.03)	.0 (.24)	.08 (.22)	.04 (.22)
Step 2: Predictors					
Cooperative group norms		.35 (.09)**		.26 (.10)*	.18 (.10)†
Group positive affect		.21 (.09)*		.24 (.09)*	.19 (.09)†
Step 3: Mediator					
Collective efficacy					.23 (.11)*
R^2	.07	.29	.02	.19	.23
ΔR^2		.22***		.17***	.03*
F	1.17	4.38	.39	2.55	2.79

$N = 97$. Standardized regression coefficients are shown. Numbers in parentheses represent standard errors

† $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$

To test the mediating effect of collective efficacy, we adopted Baron and Kenny's (1986) procedure. According to Baron and Kenny (1986), three pre-conditions should be fulfilled for a mediating effect to exist. First, the independent variable should be significantly associated with the mediator, which has already been confirmed (Hypotheses 3 and 5). Second, the independent variable must be related to the dependent variable. The second condition has also been met as described above (Hypotheses 1 and 2). Third, when the independent variable predicts the dependent variable, the mediator should have a significant relationship with the dependent variable. In addition, the relationship between the independent and dependent variables should be either non-significant (full mediation) or reduced (partial mediation) in the presence of the mediator.

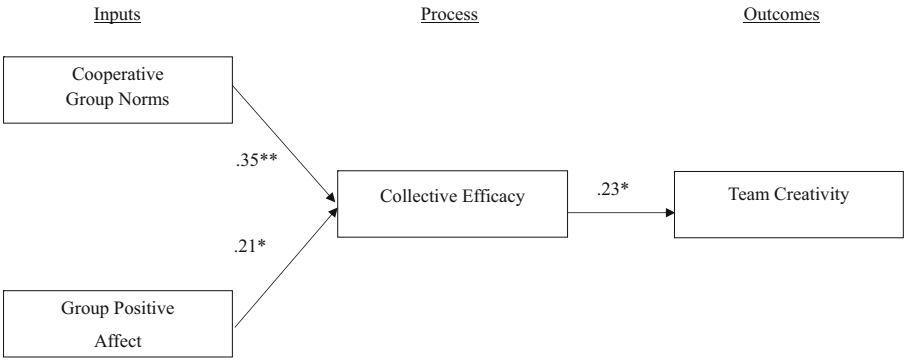
To test the third condition of mediation, we regressed team creativity on cooperative group norms and group positive affect in the second step and collective efficacy in the third step. As depicted in Table 3, collective efficacy significantly predicted team creativity (β = .23, p < .05). Moreover, when collective efficacy was included in the regression analysis, the relationships between cooperative group norms and team creativity (β = .18, p = n.s.) and between group positive affect and team creativity (β = .19, p = n.s.) became non-significant, which indicates full mediation. Furthermore, as recommended by Preacher and Hayes (2008), we performed bootstrapping analyses to estimate 95 % bias-corrected confidence interval around the proposed indirect effects by using 10,000 bootstrap samples. The indirect effect of cooperative group norms on team creativity through collective efficacy was .12, and 95 % confidence interval ranged from .03 to .26, not including zero. Similarly, the indirect effect of group positive affect on team creativity via collective efficacy was .10, and the 95 % confidence interval ranged from .02 to .21, not containing zero. These results revealed that mediating effect of collective efficacy was statistically significant for both cooperative group norms and positive group affect. Overall, the findings of the mediation analyses, coupled with the bootstrapping results, provide support for Hypotheses 4 and 6. The results of the bootstrapping analysis are reported in Table 4 and the results of hypothesis-testing are summarized in Fig. 2.

Table 4 Results of bootstrapping analysis

	Total effect			Indirect effect (95 % CI)			
	Total effect	SE	p-value	Bootstrap indirect effect	Bootstrap SE	Lower limit	Upper limit
The effect of cooperative group norms on team creativity through collective efficacy	.37	.09	< .01	.12	.05	.03	.26
The effect of group positive affect on team creativity through collective efficacy	.34	.08	< .01	.10	.04	.02	.21

Number of bootstrap samples = 10,000

SE Standard error; *CI* Confidence interval



$N = 97$. Standardized regression coefficients are presented.
* $p < .05$, ** $p < .01$.

Fig. 2 The results of hierarchical regression analysis

Discussion

The current study explored team-level antecedents and mediating process of team creativity. Drawing on social cognitive theory and Paulus and Dzindolet's (2008) group creativity model, we proposed cooperative group norms and group positive affect as critical group climate and member variables that affect team creativity, respectively. We further posited the mediating effect of collective efficacy on the relationships between the two antecedents and team creativity. Our findings demonstrated that both cooperative group norms and group positive affect were significant predictors of team creativity, and that these relationships were fully mediated by collective efficacy. These findings extend previous research in several ways.

In the creativity literature, although much research has strived to identify factors contributing to team creativity, only a handful of studies have focused on both personal and contextual factors simultaneously. Furthermore, the majority of previous research has been conducted without a solid theoretical framework. Our findings clearly indicate that both cooperative group norms and group positive affect are pivotal to enhancing team creativity, which validates Paulus and Dzindolet's (2008) group creativity model as well as the premise of social cognitive theory that personal and environmental factors are interactive determinants of human activities. Among the four types of group inputs in the group creativity model (i.e., group climate, group structure, group member variables, and external demands), group climate (i.e., cooperative group norms) and group member variable (i.e., group positive affect) had a significant relationship with team creativity, controlling for group structure (i.e., team size and longevity) and external demands (i.e., functional areas). This finding suggests that group climate and group member factors make a unique contribution to team creativity over and above the variance accounted for by group structure and external demands. As such, the current study contributes to the creativity literature by simultaneously examining the roles of group climate and group member variable on team creativity and demonstrating that these two input factors are more influential than the other types of inputs in predicting team creativity.

Our study also expands team creativity research by attending to the role of cooperative group norms as an antecedent of team creativity, which has been underestimated

in the creativity literature. So far, there has been controversy regarding the effects of norms on creativity. Several studies have shown that behaviors deviating from norms or rules contribute to creativity (Amabile, 1996; Eisenmann, 1990). In contrast, other studies have reported a positive relationship between norms and creativity because norms clearly establish expectations of preferred behaviors (Adarves-Yorno, Postmes, & Haslam, 2007; Carmeli & Schaubroeck, 2007). These studies have mainly focused on individualistic or risk-taking norms as a precondition of creativity (Goncalo & Staw, 2006; Kanter, 1988; Shin & Eom, 2014; Walton & Kemmelmeier, 2012), which implies that deviation from the status quo or the majority's opinions can serve to promote creativity. Complementing prior work focusing on individualistic or risk-taking norms, our study reveals that cooperative norms can also boost team creativity by engendering collective efficacy within the team. One implication of our findings is that different types of norms might be called for at different levels of organizations. That is, in order for individual employees to generate creative outputs, they may need to deviate from the majority's ideas. On the contrary, norms stressing collaboration and teamwork might be necessary for team members to produce creative outputs collectively. Thus, our study elaborates on the knowledge of norms and creativity by highlighting the importance of cooperative norms in team creativity and raising the possibility that different types of norms play differential roles at different levels of organizations.

The positive relationship between group positive affect and collective efficacy endorses the proposition of social cognitive theory, which suggests that emotional arousal is a precondition for shaping efficacy beliefs (Bandura, 1997; Gist, 1987). In addition, the significant association between group positive affect and team creativity is consistent with prior findings that report a positive relationship between positive affect and creativity at the team level (Rhee, 2007; Shin, 2014; Tsai et al., 2012). This finding supports the broaden-and-build theory of positive emotions (Fredrickson, 1998), which posits that positive affect expands an individual's attention, cognition, and action and builds physical, intellectual, social, and psychological resources. Although this theory was originally postulated to explain creativity at the individual level, our findings suggest that the broaden-and-build processes can operate at the team level. Positive affect displayed among team members not only expands individual members' cognitive and psychological resources but also facilitates synergistic dynamics among team members, which elevates the overall creativity of the team (Rhee, 2007). Thus, the broaden-and-build theory can serve as a relevant theory for addressing the link between positive affect and creativity at the team level.

Another theoretical contribution of our research pertains to the mediating effect of collective efficacy. Our results reveal collective efficacy as a crucial intervening mechanism underlying the relationships between cooperative group norms and group positive affect and team creativity. Our mediation analyses clearly show that both cooperative group norms and group positive affect are linked to team creativity only when team members hold common beliefs about the team's capabilities. These findings validate Paulus and Dzindolet's group creativity model in that group member and group climate inputs affect team creativity by facilitating the cognitive, motivational, and social processes of collective efficacy. As such, our study demonstrates that Paulus and Dzindolet's model is an appropriate theoretical framework for delineating the key inputs and processes of team creativity.

Furthermore, the finding that collective efficacy is positively associated with team creativity adds value to the literature. Unlike prior findings suggesting the significant role of team creative efficacy as a mediator of team creativity (e.g., Shin & Zhou, 2007), the present findings indicate that general collective efficacy is a crucial intermediary mechanism that translates the effects of cooperative group norms and group positive affect on team creativity, which implies that different forms of efficacy may play a mediating role depending on the nature of the group-level inputs. Because we focused on general group contextual and member factors as antecedents of team creativity, general collective efficacy turned out to mediate these relationships in the present dataset. On the contrary, domain-specific efficacy can operate as a linking mechanism between inputs related to the specific domain and creativity (Tierney & Farmer, 2002). Thus, the unique roles and relative importance of general and domain-specific efficacy in predicting team creativity should be further explored in future research.

Practical implications

The current study also has several practical implications to help team leaders effectively manage their teams. Based on the present findings, setting cooperative group norms can help work teams boost their creativity. These norms encourage team members to cooperate with one another, which offers opportunities for closely interacting to solve problems or generate novel ideas. Thus, team leaders may consider formulating both explicit and implicit cooperative norms within their teams by clarifying team members' expected behavioral patterns and rewarding cooperative work behaviors. Team leaders can also cultivate a cooperative work climate by stimulating team members to generate and share their ideas freely and building teamwork among the members.

As a way to enhance collective efficacy and team creativity, team leaders may benefit from composing individuals with a high level of positive affect. Selecting extraverted individuals or those with positive affective dispositions can help teams maintain a high level of group positive affect. The affect literature suggests that the leader's emotional competence is critical to managing group affect effectively (Erez, Misangyi, Johnson, LePine, & Halverson, 2008; Kelly & Barsade, 2001). Team leaders can shape group positive affect by facilitating team members' interactions and displaying emotions suitable for the task situation (Kelly & Barsade, 2001). Taking one step forward, organizations may need to consider recruiting and promoting individuals with strong emotional competence to managerial positions as well as training the current leaders to improve their emotional management skills.

Limitations

Despite its theoretical and practical implications, this study has several limitations. Because we employed a cross-sectional design, there is limited causality among the variables. For instance, members of the teams that have produced creative outputs are likely to possess higher collective efficacy. Likewise, it is plausible that the creative performance of teams causes members to experience more positive emotions. Therefore, to make stronger causal inferences among the variables, future research may need to test the proposed relationships by using longitudinal or experimental designs.

While we uncovered the mediating process between cooperative group norms and group positive affect and team creativity, we did not specify any boundary conditions that can affect these relationships. Prior research has reported that leadership and trust served as boundary conditions of the team inputs-creativity relationships (e.g., Shin & Eom, 2014; Shin & Zhou, 2007; Tsai et al., 2012). In addition, there is empirical evidence that the role of cooperation in team outcomes can vary depending on the level of task or outcome interdependence (e.g., De Dreu, 2007), which suggests the potential moderating effect of task or outcome interdependence on the relationship between cooperative norms and creativity. For these reasons, to enrich our understanding of factors and boundary conditions that influence team creativity, future work could be directed at exploring boundary conditions of the relationships between cooperative group norms and group positive affect and team creativity.

The full mediation of collective efficacy suggests that there might be unexplained paths between the two input variables and collective efficacy. The process in which cooperative group norms trigger collective efficacy might differ from the process in which group positive affect leads to collective efficacy. Thus, future researchers may need to probe into the potential intermediary mechanisms between cooperative group norms and collective efficacy and between group positive affect and collective efficacy. Moreover, collective efficacy might not be the only mediator that intervenes the relationships between cooperative group norms and group positive affect and team creativity. To assess the relative importance of collective efficacy in predicting team creativity, more diverse cognitive, motivational, and social processes could be considered simultaneously. Finally, multilevel investigations into complicated dynamics among norms, affect, efficacy, and creativity at different levels of organization would comprise an interesting research agenda.

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