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Team Psychological Needs and Radical versus Incremental Creativity of Work Teams

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ABSTRACT

This study distinguishes between radical and incremental creativity at the team level. In addition, group composition in terms of members' psychological needs is identified as a distinct driver of radical and incremental team creativity. Statistical analysis based on multisource data of 65 work teams shows that (a) team-level need for achievement has a negative main effect on radical team creativity, which disappears in teams with optimistic leaders; (b) team-level need for affiliation has a negative main effect on incremental team creativity, which becomes positive when teams possess high social competence; and (c) team-level need for power is positively related to radical and incremental team creativity. Our analysis demonstrates the multifaceted nature of team creativity and the distinct implications of team-level psychological needs for team creativity.

In contemporary business environments, organizations increasingly rely on teams to generate creative solutions for work-related challenges and gain competitive advantages (Anderson, Potočnik, & Zhou, 2014; Lee et al., 2020). Consistent with individual creativity, team creativity is broadly conceptualized as "the generation of novel and appropriate ideas, solutions, or processes in the context of team objectives" (Sung & Choi, 2012, p. 4). However, such a general approach to and a broad definition of team creativity should be contested because work teams increasingly operate with idiosyncratic environmental demands, thus encountering different challenges (Barczak, Lassk, & Mulki, 2010; Mainemelis, Kark, & Epitropaki, 2015). Accordingly, assuming a unitary form of creativity in teams with varying properties and disparate tasks under diverse environments is impractical.

Relevant micro- and macro-level studies reflect the above diverse and shifting demands for creativity, which should be conceived of as a multidimensional construct that comprises plural types (Dewar & Dutton, 1986; Mainemelis et al., 2015). Differentiating types of innovation, organization-level studies discern the exploration of new opportunities and products from the exploitation of existing routines and markets (Lavie, Stettner, & Tushman, 2010). Similarly, individual-level studies acknowledge that creativity can range from minor adaptations to radical breakthroughs (Madjar, Greenberg, & Chen, 2011). Such a distinction has been largely lacking in meso- or team-level studies. Complementing the prevailing uniform and monolithic conceptualization of team creativity (Sung & Choi, 2012), the present study extends the literature by examining team creativity as a multifaceted construct.

Scholars recently argued that different antecedents may lead to varying forms of creativity. Certain antecedents may "promote or hinder more radical ideas, whereas others may influence only incremental improvements and adaptations" (Gilson & Madjar, 2011, p. 21). Gilson and Madjar (2011) found that intrinsic motivation enhances radical creativity, whereas extrinsic motivation leads to incremental creativity. Madjar et al. (2011) further reported that risk-taking willingness has a greater effect on radical creativity than on incremental creativity. These differential predictors address distinct

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employee motivation because creativity requires proactive engagements and additional efforts relative to routine performance (Mumford, Reiter-Palmon, & Redmood, 1994). In the componential model of creativity, Amabile (1988) emphasized the role of motivation that "makes the difference between what an individual can do and what an individual will do" (p. 133). Teams are composed of individuals; hence, members' motives may have critical implications on the emergence of distinct forms of team creativity.

We consider this potential of member motives and focus on "team psychological needs," which refer to a group composition of motive dispositions of members. Drawing on motive disposition theory (MDT) that underscores implicit motives of individuals shaping their social and task-related behaviors (Sheldon & Schüler, 2011), this study examines three aspects of collective team psychological needs, namely, need for achievement (N–Ach), need for affiliation (N–Aff), and need for power (N–Pow) (McClelland, 1987). Extending MDT, the self-concordance model of human behavior emphasizes proactive motivation and conative processes through which people pursue their goals through motive-congruent behaviors (Sheldon & Elliott, 1999). As fundamental drivers representing what "people want and desire," different dimensions of psychological needs should supply distinct team motivational resources that determine emergent forms of team creativity through motive-congruent behaviors of members.

We further propose that the relationships between team psychological needs and the two forms of team creativity are moderated by leader and team characteristics. From the perspectives of MDT and the self-concordance model, leader and member characteristics may offer situational cues that modify members' motive-congruent behaviors, thereby attenuating or accentuating the relationships between team psychological needs and creativity (Duan, Wang, Brinsfield, & Liu, 2020). Specifically, we identify leader optimism and team social competence as meaningful social contexts that shape such relationships.

In summary, this study distinguishes between radical and incremental team creativity by drawing from the conceptual and empirical developments of macro- and micro-level studies on innovation and creativity. This distinction may enrich the creativity literature and provide new theoretical insights and practical guidelines for achieving desirable forms of creative performance in work teams. On this basis, we propose that team psychological needs have varying effects on the two forms of team creativity. We also explore if these relationships change as a function of team social contexts (i.e., leader optimism and team social competence) as possible moderating contingencies. Our conceptual framework is empirically validated using multisource data from 65 work teams from various industries.

Theoretical framework and hypothesis development

Team creativity may rely on fundamental motivational drivers of team members that shape their behavior toward others and tasks (Duan et al., 2020; Sheldon & Elliott, 1999). Nonetheless, the role of these primary human motives in shaping collective outcomes, including team creativity, has been largely neglected (Chun & Choi, 2014). We appreciate the micro-foundations of team-level phenomena that a bottom-up process can be driven by individual motives, which comprise the major ingredients and input of team performance. In the input–process–output model of team effectiveness, previous studies focused on surface-level characteristics (e.g., age, gender, education, race) and deep-level characteristics (e.g., Big 5 personality factors, cultural values, time orientation) of members as input factors to explain group processes and outcomes, including team creativity (Agarwal & Woolley, 2018; Cheung, Gong, Wang, Zhou, & Shi, 2016). The present study complements and extends this literature by examining the role of members' psychological needs on team creativity. With these objectives, we propose and empirically validate that the three types of team psychological needs (i.e., N–Ach, N–Aff, and N–Pow) exert distinct effects on the two forms of team creativity. Figure 1 shows that leader optimism is a meaningful situational contingency for team N–Ach and N–Pow and that team social competence moderates the effects of N–Aff on team creativity. The overall conceptual framework summarized in Figure 1 is further justified below.

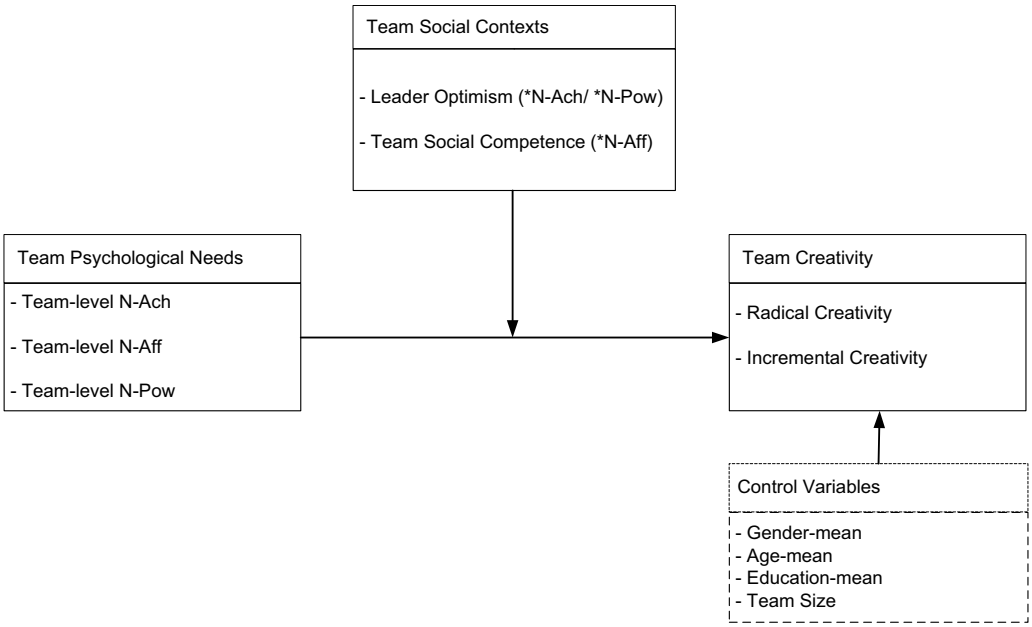

Figure 1. Theoretical framework of team creativity.

Team psychological needs

The self-concordance model of human behavior suggests that people strive to satisfy implicit needs and exert proactive efforts to fulfill their dispositional motives (Duan et al., 2020; Sheldon & Elliot, 1999). MDT further denotes that people differ in innate desires and the intensity of motive dispositions, directing their behaviors toward attaining motive-relevant incentives, such as enhanced performance, intimate interpersonal relations, and power (McClelland, 1987; Sheldon & Schüler, 2011). MDT mainly focuses on three fundamental motives that guide human behavior, namely, N–Ach, N–Aff, and N–Pow. Members' collective desires within a given social context prescribe the pursued goals and interpersonal dynamics in work teams because those needs "capture the specific resources they want and their specific behavioral implications" (Chun & Choi, 2014, p. 437). In this sense, examining team psychological needs offers new theoretical insights that cannot be acquired from investigating individual needs.

When viewed as individual resources to be mobilized for team performance, the psychological needs of each member may add up to collective team-level motives and form a distinct team property based on pooled resources of members (cf. additive composition model, Chan, 1998). Consistent with previous group studies that used the average of member dispositional characteristics (e.g., Barrick, Stewart, Neubert, & Mount, 1998; Prewett, Brown, Goswami, & Christiansen, 2018), this study adopts the additive composition model. Accordingly, we develop a theoretical model by conceptualizing team psychological needs as the team-level aggregated average of members' needs, which represent the overall strength or "elevation" (cf. cumulative construct, Cronin, Weingart, & Todorova, 2011). Team psychological needs shape a team's collective motivation because team-level shared beliefs and attitudes are commonly formed through bottom-up processes on the basis of member dispositional characteristics and continuous interactions among members (Hu & Liden, 2015).

Radical and incremental team creativity

Organizational innovation literature and technology management discipline distinguished radical and incremental innovations, often referred to as exploration and exploitation, respectively. These two

distinct forms of innovation characterize disparate levels of discontinuity or distance from existing products and markets, different degrees of uncertainty or risks involved, and time perspectives (i.e., short versus long term) (Benner & Tushman, 2003; Gupta, Smith, & Shalley, 2006). The need for both forms has been highlighted for successful innovation strategy (Lavie et al., 2010). Likewise, in challenging the broad and general notion of individual creativity, questions have been raised regarding its unitary construction, presenting the need for distinguishing radical from incremental creativity (Gilson, Lim, D'Innocenzo, & Moye, 2012). A similar distinction at the team-level is necessary because teams encounter diverse creative demands depending on their tasks, goals, and performance contexts.

Alexander and Van Knippenberg (2014) focused on team processes required for radical innovation in work teams and theorized that "even when innovativeness is to some degree a continuous variable, there are qualitative differences distinguishing radical from incremental innovation, and there are challenges that are mainly associated with radical innovations" (p. 424). Except for this conceptual work, we found no other theoretical or empirical analysis on radical versus incremental creativity at the team level. Therefore, the present study fills this void in the literature by examining radical and incremental forms of team creativity.

Consistent with extant definitions (Gupta et al., 2006; Madjar et al., 2011), we define radical team creativity as the generation of ideas that significantly differ from current practices and products as team members work together on tasks. For instance, oxygen-scavenging packaging represents radical creativity that redefined the food industry by protecting and preserving foods from external contamination. By contrast, incremental team creativity represents the generation of ideas that offer minor modifications to current practices and products as team members work together on tasks. For example, Amazon.com's frustration-free packaging program slightly modified their existing process to aid users in opening packages. Similar to extant literature (Kozlowski & Klein, 2000), this study regards team creativity as a group-level performance that emerges through certain functions involving lower-level units, such as interactions and communication among members, but also distinguishes its two forms by drawing on individual- and organization-level studies.

Team psychological needs and radical and incremental creativity

Drawing on MDT (Sheldon & Elliot, 1999), this study proposes that the three dimensions of team psychological needs (i.e., N–Ach, N–Aff, and N–Pow) exert varying predictive effects on radical and incremental team creativity because team members behave proactively and selectively in accordance with their motive dispositions.

Team-level N–Ach

People with high N–Ach are characterized by their hard work to achieve goals and their pursuit of competence and high performance standards (Steinmann, Kleinert, & Maier, 2020). McClelland (1987) postulated that high N–Ach people tend to pursue calculated risk and avoid high-risk situations. Empirical studies identify N–Ach by one's preference for moderate risks (e.g., "I take moderate risks and stick my neck out to get ahead at work," Mathieu, 1990; Steers & Braunstein, 1976). Accordingly, teams with high N–Ach members prefer a predictable risk with reasonable complexity, in which the success depends on their skills and efforts (Brueckner, Bosak, & Lang, in press; Phillips & Gully, 1997). These teams are likely to modify current work procedures to suit new situations and initiate adaptation as needed to improve established routines because innovation is required as task demands in most organizations (Anderson et al., 2014). Therefore, incremental creative endeavors are concordant with the collective task motivation of high N–Ach members.

However, members with high N–Ach may avoid tasks or ideas that involve high uncertainty and risks beyond their control because such situations jeopardize their fundamental desire for superior performance. Innovation literature suggests that "exploration often leads to failure . . . thereby creating a *failure trap*" (Gupta et al., 2006, p. 695). In particular, radical innovation is accompanied by substantial uncertainty and potential for losses (Lavie et al., 2010; Taylor & Greve, 2006). For this

reason, risk-taking willingness is positively related to radical creativity but not to incremental creativity (Madjar et al., 2011). Teams composed of high N–Ach members may avoid high-risk ideas and behavioral options that could result in uncontrollable situations and performance loss (Alexander & Van Knippenberg, 2014). Thus, these teams are motivated to abstain from high-risk, radical new ideas. Accordingly, we propose the following contrasting effects of team-level N–Ach:

Hypothesis 1: Team-level N–Ach is (a) negatively related to radical team creativity and (b) positively related to incremental team creativity.

Team-level N–Aff

N–Aff refers to the desire for positive relationships, emotional support, and a sense of belonging (McClelland, 1987). The primary satisfaction and goals of high N–Aff people are driven by harmonious social relationships; thus, they strive for interpersonal intimacy (Brueckner et al., in press). Chun and Choi (2014) demonstrated that work teams composed of high N–Aff members experience low relationship conflicts because they avoid interpersonal frictions when working together. Creative alternatives are often perceived as deviant behavior that denies extant norms and practices, thereby generating negative impressions (Runco, 2010). Despite their potential benefits, creative ideas that challenge and disrupt the status quo may engender interpersonal tension and damage social harmony (Mueller, Melwani, & Goncalo, 2012). Thus, with the threat to their desire for social approval, proposing innovative solutions may not match the motive disposition of high N–Aff people.

High N–Aff people may develop collective motivation that urges them to adhere to extant norms and develop antipathy toward status-quo-challenging actions (Chun & Choi, 2014). Moreover, they tend to ignore external demands or task requirements in favor of positive relationships (Steinmann et al., 2020). Given this tendency to maintain self-concordance with implicit motives, high N–Aff teams are unlikely to exhibit radical and incremental creativity for somewhat different reasons. These members may be discouraged from radical team creativity that entails considerable deviation from norms and the threat of social rejection from others (Duan et al., 2020). Owing to members' concerns regarding interpersonal risks (Runco, 2010), such teams may also shun away from incremental creativity that usually targets current problems and deficiencies, possibly bothering coworkers.

Hypothesis 2: Team-level N–Aff is negatively related to radical and incremental team creativity.

Team-level N–Pow

N–Pow reflects the desire to control important social resources by influencing the thoughts and actions of others (McClelland, 1987). High N–Pow people attempt to dominate group decision-making and resource allocation processes, causing competition with others (Groysberg, Polzer, & Elfenbein, 2011). For this reason, intra-team power struggles and conflicts tend to intensify among members with high N–Pow (Chun & Choi, 2014). Such power contests may impede coordinated efforts toward group goals, possibly becoming detrimental to collective performance (Hays & Bendersky, 2015). However, recent theoretical developments and empirical findings indicate that the role of power-seeking tendencies and behaviors as regards group processes and outcomes is complex and takes various forms (Greer, Van Bunderen, & Yu, 2017).

We adopt the functional perspective of power in social groups (Halevy, Chou, & Galinsky, 2011) and propose that members' power-seeking desire may enhance their creative idea generation and expression in work teams. In organizations, power can be obtained through admirable performance and noticeable contributions to the team (Steinmann et al., 2020). In line with costly signaling theory, employees with high power needs tend to generously share knowledge that is conducive to creativity, particularly when the tasks are highly significant and visible so that they can gain power and influence (Park, Chae, & Choi, 2017). Therefore, N–Pow may encourage people to proactively share knowledge and ideas that are instrumental to claiming power in contemporary contexts that favor creative solutions (Anderson et al., 2014; De Dreu & West, 2001). Creative ideas that address inefficiencies and improve team performance

incur instrumental values, especially for high N–Pow people (Duan et al., 2020). Given the overall high level of power pursuit, high N–Pow members may compete in offering creative ideas to demonstrate their superiority and outstanding value to the team (Greer et al., 2017). Thus, teams composed of high N–Pow members collectively pursue impressive contributions, resulting in increased team creativity of both types (Park et al., 2017). Hence, the following is hypothesized:

Hypothesis 3: Team-level N–Pow is positively related to radical and incremental team creativity.

Leader optimism moderating the effects of team-level N–Ach and N–Pow

Considering the implications of team psychological needs on creativity, leaders' attitudes toward creativity may offer critical social contexts for members to act on their motive dispositions. In this study, we consider leader optimism, which reflects a leader's positive thinking, hope, confidence, or "can-do" attitude that is crucial for creative engagement (Scheier, Carver, & Bridges, 1994). Given the inherent risks of creative processes, leader optimism has substantial implications on team creativity by formulating team contexts that support seeking opportunities despite the accompanying risks of failure (Srivastava & Jaiswal, 2015). Nevertheless, leader optimism is rarely considered in studies on creativity, particularly in relation to how leaders signal and encourage members' creative efforts (Lee et al., 2020). In the present study, we propose leader optimism as a critical boundary condition that moderates the effects of team psychological needs on team creativity. Considering likely shifts in group norms related to performance strategies based on leader optimism, we propose that leader optimism moderates the effects of team-level N–Ach and N–Pow on team creativity, but we do not apply the same logic to team-level N–Aff.

Team-level N–Ach and radical team creativity

Leaders with optimistic views on tasks and the future may positively evaluate risk-taking initiatives and proactive challenges of members, even failed attempts (Rego, Sousa, Marques, & Cunha, 2012). The reason is that such leaders tend to attribute positive events to personal causes and negative events to external and situational causes. For teams with high N–Ach members who hesitate to face failure, thereby avoiding radical creativity, optimistic leaders may redirect performance strategies toward new and even risky possibilities (Lee et al., 2020). Although people with high N–Ach tend to work toward self-set goals, such goals are socially defined within the set of norms and the results are recognized and known through feedback from important others (Phillips & Gully, 1997; Steinmann et al., 2020). Optimistic leaders' appreciation of risk-taking initiatives may reset the definition of performance and success. Situational cues from optimistic leaders may diminish the concerns of high N–Ach members regarding performance uncertainty associated with radical creativity accompanied by a greater possibility of failure. Thus, optimistic leaders should attenuate the negative effect of team-level N–Ach on radical team creativity.

Hypothesis 4: Leader optimism moderates the relationship of team-level N–Ach with radical team creativity, such that the relationship is less negative when leader optimism is high than when it is low.

Team-level N–Pow and radical and incremental team creativity

The most critical feature of optimism is its positivity, which enables the proactive pursuit of opportunities to achieve goals (Kluemper, Little, & DeGroot, 2009). Finance studies demonstrated that managerial optimism encourages aggressive financing, leading to a high leverage ratio (Barros & Silveira, 2008). Leader optimism may normatively endorse entrepreneurial actions and generate team contexts favoring creative behaviors (Lee et al., 2020). Under optimistic leaders, suggesting creative ideas can be a normatively acceptable and promising strategy to claim power (Duan et al., 2020). Hence, members with high N–Pow become more likely to resort to constructive suggestions and creative solutions to enhance their power (Mumford et al., 1994). In addition, although members with high N–Pow may

exhibit dominant behaviors resulting in power conflict (Chun & Choi, 2014), optimistic leaders may mitigate such tension by sharing their positive views and expectations (Rego, Sousa, Marques, & Cunha, 2012). In this sense, leader optimism may engender a safe team context for idea clashes and channel the motive dispositions of high N–Pow members toward entrepreneurial action. In this team context, presenting creative ideas, either radical or incremental, provides a self-concordant option for high N–Pow members (Brueckner et al., in press). Thus, we advance the following moderation hypothesis.

Hypothesis 5: Leader optimism moderates the relationships of team-level N–Pow with radical and incremental team creativity, such that the relationships are more positive when leader optimism is high than when it is low.

Team social competence moderating the effect of team-level N–Aff

In addition to the moderating role of leaders, the effects of team psychological needs on creativity can be affected by collective properties held by members that define team context. Specifically, we focus on team social competence that should govern the patterns of interpersonal engagements among members (Barczak et al., 2010). Social competence refers to "the ability to understand feelings, thoughts, and behavior of persons, including oneself, in interpersonal situations and to act appropriately upon that understanding" (Marlowe, 1986, p. 52). We propose that team social competence moderates the effects of team psychological needs on creativity. Considering that social competence shapes interactions and resolve relational challenges (Ferris, Witt, & Hochwarter, 2001), its moderating role will be mostly targeted at the effects of N–Aff with strong interpersonal implications.

In teams with high N–Aff members, the most serious obstacle to expressing creative ideas is perhaps the concerns about interpersonal tension and conflict (Greenhalgh & Gilkey, 1993). Creative actions, which often challenge the status quo and disrupt the interpersonal harmony and extant processes endorsed by others, mismatch with the motive disposition of high N–Aff people who "attempt to avoid friction in personal domains as much as possible due to their desire to develop and maintain favorable relationships with others" (Chun & Choi, p. 440). Thus, high N–Aff teams tend to exhibit low team creativity.

Such inhibiting effects of team-level N–Aff on team creativity may be buffered or attenuated by team social competence that enables effective social processes and softens interpersonal tension (Witt & Ferris, 2003). Teams with high social competence possess abilities to communicate dissenting ideas without hurting others' feelings and to sustain goodwill among members because they are aware of appropriate social behaviors (e.g., what to do, what to say, when to remain silent, when to speak up, how to encourage and/or persuade others) (Steinmann et al., 2020). Such empathic competence and social skills of members may enable suggesting alternative or potentially conflicting ideas without damaging their relationships or hindering the fulfillment of affiliation needs. Therefore, the negative effects of team-level N–Aff on team creativity may diminish when team social competence is high.

Hypothesis 6: Team social competence moderates the relationships of team-level N–Aff with radical and incremental team creativity, such that the relationships are less negative when team social competence is high than when it is low.

Method

Sample and data collection

To test the hypotheses, we collected data from managers enrolled in a part-time executive MBA program in a large South Korean university as approved by the IRB of the institution in which this

research was conducted. In two sessions of a core course for this program, we delivered a brief presentation that informed them of the purpose of this study and the definition of a work team, which helped them to identify a collocated team that performed the collective task to achieve shared goals. Then, we sent an invitation message to 100 managers to solicit voluntary participation in the current study, to which 89 managers responded (response rate = 89%). We delivered the survey packets to the 89 managers and their 682 constituents through postal mail with pre-stamped envelopes with return address. From this initial sample, completed surveys from 84 teams (84 leaders and 665 members) were returned. All participating leaders and members received a small souvenir with the university logo as a token of our appreciation for their participation.

Questionnaires with incomplete responses and those with clearly unreliable response patterns, such as the same response written throughout several sections of the questionnaire, were excluded. Data from teams without matching leader evaluations and those with less than three participating members were also removed because two people have been classified as a dyad rather than a group. The screening procedures yielded a final sample of 65 teams with 65 leaders and 524 members (team-level response rate = 65%). These teams represented a wide range of industries, including airline, pharmaceutical, telecommunication, software development, and cosmetics. The functional areas included business planning and administration (44.6%), sales and marketing (21.5%), research and development (R&D, 18.5%), technical service (6.2%), production and engineering (3.1%), and management support (6.2%).

In the final analysis sample, the average team size was 7.78 (*SD* = 2.55), excluding the leader. Participating team leaders and members included 7.7% and 30.8% females, respectively, and average tenures of 5.60 (*SD* = 6.75) and 5.97 years (*SD* = 7.34), respectively. Leaders and members were divided into four age groups, namely, below 30 years (0% leaders and 11.6% members), 31–40 years (4.6% and 49.2%), 41–50 years (66.2% and 31.40%), and over 51 years (29.2% and 7.8%). The education levels of leaders and members were also classified into high school graduate (0% and 2.0%, respectively), two-year college (4.6% and 10.2%), undergraduate degree (52.3% and 66.6%), and graduate degree (43.1% and 21.3%).

Measures

Data were collected from two sources to avoid potential problems associated with common method variance. Team members reported their psychological needs and team social competence, and team leaders reported their optimism and the two forms of team creativity. All variables were rated using a seven-point Likert-type scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). All scales exhibited acceptable levels of reliability.

Three dimensions of psychological needs

In the present study, members' psychological needs are identified as a group composition factor that functions as a team input to explain radical and incremental team creativity. Thus, we used the additive composition model for team-level psychological needs, which assumes that the amount of a characteristic possessed by each individual member contributes to the collective pool of that characteristic on the team (Chan, 1998). We adopted items from the Manifest Needs Questionnaire (Steers & Braunstein, 1976). Team members reported their needs in three dimensions. N–Ach was assessed using the following four items (α = .83): (a) "I try to perform better than my coworkers," (b) "I do my best work when my job assignments are fairly difficult," (c) "I try very hard to improve on my past performance at work," and (d) "I take moderate risks to move ahead at work." The four items for N–Aff (α = .70) were as follows: (a) "I try to maintain favorable interpersonal relationships with others," (b) "When I have a choice, I try to work in a group instead of by myself," (c) "I try to have time with my coworkers at work," and (d) "When my important coworkers are having a personal issue, I feel as if it is my own problem." N–Pow was measured using the following four-item scale (α = .92): (a) "I strive to gain more control over the events around me at work," (b) "I seek an active role in the

leadership of a group," (c) "I find myself organizing and directing the activities of others," and (d) "I strive to be in command when I am working in a group."

Individual member ratings of psychological needs were combined to obtain the average needs of each team. In our additive composition model, "the meaning of the higher level construct is a summation of the lower level units regardless of the variance among these units" (Chan, 1998, p, p. 236). Thus, in this model, agreement indicators or group-level aggregation statistics (e.g., r_{wg}, ICC) are not required or meaningful (Chan, 1998; Kozlowski & Klein, 2000). Nonetheless, given that the psychological needs of members were aggregated as team-level scores, we computed their aggregation statistics. The three psychological needs exhibited moderate levels of within-group agreement and group-level reliability with all significant ANOVA results (Chen, Mathieu, & Bliese, 2004): (a) N−Ach [$r_{wg(4)}$ = .77, ICC(1) = .06, ICC(2) = .35], (b) N−Aff [$r_{wg(4)}$ = .70, ICC(1) = .07, ICC(2) = .39], and (c) N −Ach [$r_{wg(4)}$ = .54, ICC(1) = .05, ICC(2) = .32].

Leader optimism

We used a three-item scale (α = .72) to assess leader optimism by adopting items from Scheier et al. (1994). Team leaders reported their optimism levels with respect to their team and their tasks, as follows: (a) "I always look at the positive side of the task," (b) "I am quite optimistic for the coming task situations," and (c) "I usually expect the best when my team is exposed to high uncertainty regarding tasks."

Team social competence

We adopted four items from Ferris et al. (2001) and changed the referent to a team level (cf. referent shift consensus model, Chan, 1998) to assess team social competence. The four items (α = .87) were as follows: (a) "Our team members find it easy to put themselves in the position of others," (b) "In various social situations, our team members clearly understand what to say and do," (c) "Our team members are good at making themselves visible with influential people in organizations," and (d) "Our team members can adjust their behavior and become the type of member needed by any situation." The scale exhibited acceptable levels of (a) within-group agreement among employees ($r_{wg(4)}$ = .73) (LeBreton & Senter, 2008) and (b) intra-class correlations that reflect betweeN−group variations in member ratings [ICC(1) = .17, ICC(2) = .64] along with the significant group-level effect (i.e., F value for ANOVA = 2.79, $p < .001$) (Chen et al., 2004).

Radical and incremental team creativity

Drawing on existing measures for individual creativity (Madjar et al., 2011), we assessed radical and incremental creativity by changing the referent to the team level. In accordance with existing literature, team creativity was reported by team leaders who are acknowledged as reliable sources of information on team performance (De Dreu & West, 2001; Sung & Choi, 2012). For radical team creativity, we used the following three items (α = .92): "Our team (a) suggests radically new ways for doing tasks, (b) demonstrates originality in performing tasks, and (c) is a good source of highly creative ideas." Team leaders also reported on incremental team creativity by responding to the following three-item scale (α = .91): "Our team (a) adapts already existing ideas or practices, (b) utilizes previously existing ideas or work in an appropriate new way, and (c) modifies previously existing work processes to suit current needs."

Control variables

We controlled several variables that could influence the tested relationships. First, considering the implications of demographic characteristics on psychological needs and creativity (Madjar et al., 2011), our analysis included the following member characteristics: gender (0 = male, 1 = female), age (1 = 30 years or below, 2 = 31–40 years, 3 = 41–50 years, 4 = 51 years or older), and education (1 = high school graduate, 2 = two-year college, 3 = undergraduate degree, 4 = graduate degree). Second, studies on groups indicated that size is a significant factor in shaping group processes and outcomes (Chun & Choi, 2014) and can thus affect the relationship between team composition and creativity.

Therefore, the number of members was controlled on the sampled teams. The analysis results did not change with or without these control variables.

Results

Although we used different sources, the data were collected at the same time. Thus, a confirmatory factor analysis (CFA) of the 25 items that comprise the measures of 7 study variables was conducted to test their empirical distinctiveness. As reported in Table 1, the seven-factor model exhibited an acceptable fit with the observed data performed significantly better than plausible alternative measurement models (all $\Delta\chi^2$ tests, $p < .001$). All measurement items exhibited significant loadings on their corresponding latent factor (all $p < .001$). Overall, these CFA results demonstrate the empirical distinctiveness of the study variables. Table 2 shows the descriptive statistics and correlations among the variables. The data used for the current analysis are available upon reasonable request.

Hypothesis tests

The hypotheses were tested using a series of hierarchical multiple regression analyses conducted at the team level. All variables were mean-centered to reduce multicollinearity problems among the main effect variables and their interaction terms (Katrichis, 1993), which were entered after their corresponding main effects were controlled. Table 3 shows the results of the stepwise hierarchical regression analysis.

Main effects of team psychological needs

Hypothesis 1 stated that team-level N−Ach is negatively related to radical creativity (H1a) but positively related to incremental creativity (H1b). As shown in Model 2 of Table 3, team-level N−Ach had a significant negative effect on team radical creativity ($\beta = -.40$, $p < .01$), thereby confirming H1a. However, no significant relationship was established for incremental creativity ($\beta = -.13$, *ns.*), rejecting H1b.

In Hypothesis 2, we posited that team-level N−Aff is negatively related to radical and incremental team creativity. Our analysis showed that team-level N−Aff was a significant negative predictor of

Table 1. Model comparison for the confirmatory factor analysis.

Model	χ^2 (*df*)	*p*	CFI	SRMR	AIC
Seven−factor model: Hypothesized model	372.88 (254)	.000	.90	.08	514.88
Five-factor model: Three dimensions of psychological needs as a single construct	480.39 (265)	.000	.80	.10	600.39
Two-factor model: Member ratings and leader ratings	822.85 (274)	.000	.49	.15	924.85
Single-factor model: All variables collapsed as a single construct	1022.40 (275)	.000	.31	.19	1122.40

CFI = Comparative Fit Index; SRMR = Standardized Root Mean−Square Residual; AIC = Akaike's information criterion.

Table 2. Means, standard deviations, and correlations among study variables.

Variables	M	SD	1	2	3	4	5	6	7	8	9	10	11
1. Gender-Mean	.32	.27	–										
2. Age-Mean	2.27	.53	−.37**	–									
3. Education-Mean	3.00	.52	−.19	.22	–								
4. Team Size	7.78	2.55	−.20	.40**	.23	–							
5. Team-level N-Ach	5.36	.36	−.11	−.08	−.01	.07	–						
6. Team-level N-Aff	5.43	.29	−.21	.19	.02	.15	.45**	–					
7. Team-level N-Pow	4.28	.56	−.23	−.18	−.11	−.08	.59**	.36**	–				
8. Leader Optimism	5.10	.87	−.01	.01	.01	−.05	.07	.05	.14	–			
9. Team Social Competence	4.99	.49	.01	−.09	.29*	−.01	.28*	.24*	.20	−.03	–		
10. Radical Team Creativity	4.10	.99	.13	.05	.32*	−.10	−.18	−.04	.09	.02	.22	–	
11. Incremental Team Creativity	5.02	.86	.34**	−.32**	−.05	−.17	−.02	−.25*	.18	.19	.24	.48**	–

The unit of analysis is team ($N = 65$). *$p < .05$; **$p < .01$.

Table 3. Results of hierarchical regression analyses predicting team creativity.

	Radical Team Creativity			Incremental Team Creativity		
Predictors	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Step 1: Main effects						
Gender-Mean	.20	.32*	.21	.26*	.37**	.24*
Age-Mean	.12	.18	.16	−.22	−.08	−.11
Education-Mean	.37**	.41**	.46***	.06	.09	.06
Team Size	−.19	−.13	−.21	−.04	.01	−.05
Team-level N−Ach (Team N−Ach)		−.40**	−.43**		−.13	−.21
Team-level N−Aff (Team N−Aff)		.02	.06		−.26*	−.22
Team-level N−Pow (Team N−Pow)		.47**	.53**		.44**	.37*
Step 2: Moderation						
Leader Optimism (LeaderOpti)			−.03			.15
Team Social Competence (TSociComp)			.06			.22
Team N−Ach * LeaderOpti			.39*			.23
Team N−Aff * LeaderOpti			−.15			.03
Team N−Pow * LeaderOpti			−.12			−.09
Team N−Ach * TSociComp			.15			−.01
Team N−Aff * TSociComp			.33*			.40**
Team N−Pow * TSociComp			−.37*			−.14
F	2.99*	3.57**	3.25***	2.91*	3.39**	3.45***
R2	.17	.31	.50	.16	.29	.51
Δ*R2*		.14*	.19*		.13*	.22*

N = 65; Standardized beta coefficients are shown. *p< .05; **p< .01; ***p< .001.

incremental team creativity (β = −.26, p < .05) but was not significantly related to radical team creativity (β = .02, *ns.*) (Models 2 and 5, Table 3). Thus, Hypothesis 2 was supported only for incremental team creativity.

In Hypothesis 3, we proposed that team-level N−Pow is positively related to radical and incremental team creativity. Our analysis revealed that team-level N−Pow was a significant predictor of radical and incremental team creativity (β = .47 and .44, respectively, both p < .01) (Models 2 and 5, Table 3). Thus, the results fully supported Hypothesis 3.

Moderating effects of leader optimism

In Hypotheses 4 and 5, we posited that leader optimism positively moderates the effects of team-level N−Ach on radical team creativity, and N−Pow on team radical and incremental creativity. The interaction between members' N−Ach and leader optimism was significant and positive for radical team creativity (β = .39, p < .05) (Model 3, Table 3). To further probe this significant interaction, we conducted simple slope analysis at high (one *SD* above the mean) and low (one SD below the mean) levels of leader optimism (Aiken & West, 1991). In Figure 2, the two regression lines demonstrate that the effect of team-level N−Ach on radical team creativity was significantly negative when leader optimism was low (b = −1.05, p < .001) but not when leader optimism was high (b = .10, *ns.*). These patterns confirmed Hypothesis 4. However, the interactions between team-level N−Pow and leader optimism were statistically insignificant (Models 3 and 6, Table 3), rejecting Hypothesis 5.

Moderating effects of team social competence

Hypothesis 6 posited that team social competence attenuates the negative effects of team-level N−Aff on team creativity. Models 3 and 6 in Table 3 showed that team social competence exhibited significant positive interactions with team-level N−Aff in predicting radical (β = .33, p < .05) and incremental team creativity (β = .40, p < .01). We conducted simple slope analyses to clarify these significant interactions (Aiken & West, 1991). The two regression lines in Plot A of Figure 3 confirm that the relationship between team-level N−Aff and radical team creativity was negative in teams with low (one SD below the mean) social competence (b = −.58, p < .05), but positive in those with high (one SD above the mean) social competence (b = .52, p < .05). Moreover, Plot B of Figure 3 shows that the effect of team-level N−Aff on incremental team creativity was negative for teams with low social competence

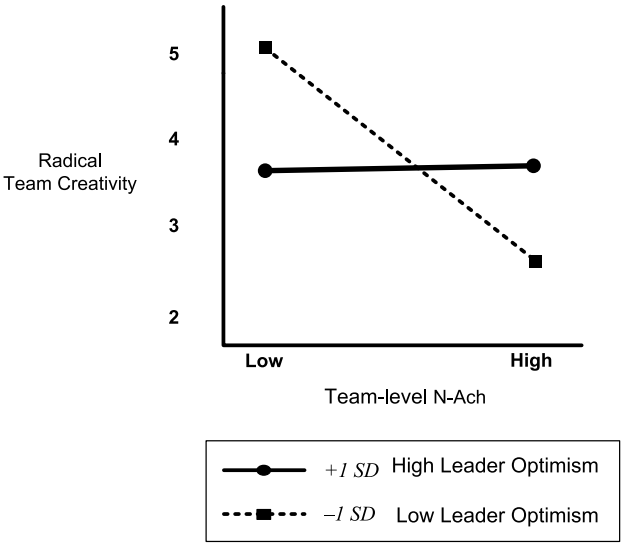

Figure 2. Interactions of Team-level N–Ach and leader optimism in predicting radical team creativity.

($b = -.99$, $p < .001$) but positive for those with high social competence with marginal significance ($b = .42$, $p < .10$). These patterns support Hypothesis 6.

Post-hoc analysis

Although the average level of various dispositions (e.g., demographics, personality, and cultural values) was most widely used in group studies on member characteristics, the variation or diversity in member dispositions also elicited considerable research attention (cf. dispersion composition model; Chan, 1998). The same average level of member needs could differently influence group outcomes depending on their dispersion across members (Chun & Choi, 2014). We thus tested the effects of team-level standard deviations of the three psychological needs and found no significant effects on radical and incremental team creativity.

We also checked for group differences among diverse functional areas in the relationships between psychological needs and radical and incremental team creativity. Teams in specific functions, such as

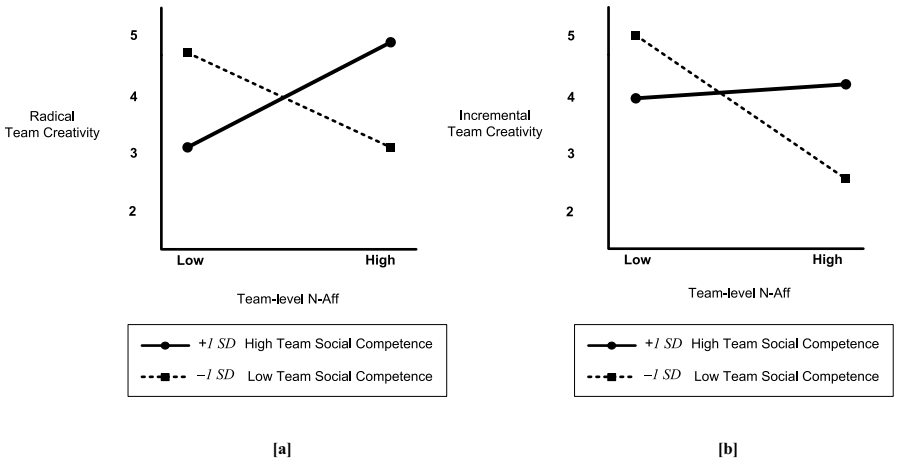

Figure 3. Interactions of Team-level N–Aff and team social competence in predicting team creativity.

service and R&D, exhibit specific types of psychological needs owing to the organizational selection procedures, and their distinct task characteristics or demands may require specific types of creativity (Sung, Antefelt, & Choi, 2017). The results did not show any significant differences in three dimensions of psychological needs across different team functions (all, $p > .10$). However, R&D teams showed a marginally significant difference ($t = 1.66$, $p < .10$) from management support teams, indicating that radical team creativity is slightly high in R&D teams.

We conducted post-hoc comparisons of regression coefficients of team psychological needs. To this end, unstandardized regression coefficients were compared by computing z scores for their difference, which was tested with a one-tailed analysis considering the reduced power due to a small sample size. Team N−Ach showed a significantly more negative relationship with radical than incremental team creativity ($b = -1.1$ and $-.31$, respectively, $z = 1.49$, $p < .10$). Team N−Aff showed a significantly more negative relationship with incremental than radical team creativity ($b = -.76$ and .07, respectively, $z = 1.41$, $p < .10$). Team N−Pow was positively related to both forms of creativity, with no statistical difference between the two coefficients ($b = .81$ and .66, respectively, $z = .43$, *ns*.).

Discussion

This study responded to repeated calls for empirical investigation of creativity as a multidimensional construct with distinct antecedents, particularly at the team level (Anderson et al., 2014; Mainemelis et al., 2015). We identified motivational drivers, namely, team-level N−Ach, N−Aff, and N−Pow, that position teams to behave differently toward radical and incremental forms of creativity. This study also examined the boundary conditions (e.g., leader optimism and team social competence) of the relationships between team psychological needs and creativity, which provides critical information in managing teams with different psychological needs. Our analysis suggested that rather than being a unitary and monolithic construct, team creativity can manifest in distinct forms, which can be shaped by disparate motive dispositions of members, leader attitudes, and team characteristics. The implications of this study and its limitations that warrant future research are discussed below.

Team psychological needs and radical versus incremental team creativity

The current EFA and CFA results confirm that radical and incremental creativity are empirically distinct constructs at the team level, consistent with findings from the studies at the individual level (Gilson & Madjar, 2011; Madjar et al., 2011) and macro-level studies on exploration and exploitation (Benner & Tushman, 2003). Further conceptual and empirical work is warranted to understand how these different forms of team creativity emerge and affect subsequent performance outcomes for teams and members.

This study focused on team-level psychological needs as critical drivers of different forms of team creativity, and empirical analysis largely confirmed such theoretical expectations. First, team-level N−Ach was negatively related to radical team creativity. Teams composed of high N−Ach members may avoid risks associated with radical ideas, which cannot be predicted or controlled, thereby introducing situations that do not match their motive disposition toward high performance (Phillips & Gully, 1997; Steinmann et al., 2020). By contrast, team N−Ach did not affect incremental team creativity, indicating that the risk is insufficient to generate defensive risk-averse reactions. Thus, incremental creativity may be self-concordant or neutral behavior for high N−Ach members.

Second, team-level N−Aff was negatively related only to incremental creativity. Incremental adjustment and adaptation of current routines require continuous and frequent negotiations, challenging the incumbents responsible for those processes, and thus likely generating constant tension and conflicts. High N−Aff members may feel a considerable burden in challenging current practices (Brueckner et al., in press; McClelland, 1987); thus, incremental creativity is suppressed. However, team N−Aff was unrelated to radical team creativity, which may be due to its lesser probability to cause

interpersonal conflict. We speculate that team N–Aff is somehow distant and irrelevant to the radical idea generation of teams because the processes underlying radical creativity may be governed by strenuous task dedication and intensive cognitive endeavors beyond interpersonal concerns (Alexander & Van Knippenberg, 2014). Thus, the social or interpersonal underpinnings versus the task or cognitive processes that may differentially predict incremental versus radical team creativity require further conceptual and empirical developments.

Finally, of the three team psychological needs, team-level N–Pow was the only positive predictor of radical and incremental team creativity. In teams with high N–Pow, presentation of creative (either incremental or radical) ideas is instrumental in displaying superior and unique contributions to the team, helping members secure power recognition that match their motive disposition (Chun & Choi, 2014; Groysberg et al., 2011). High N–Pow people may vie for power and influence by continually offering creative ideas. However, these team-level creative actions based on instrumental, power-striving needs are diametrically opposed to the prevailing emphasis on intrinsic motivation based on genuine task interest as a critical driver of creativity (Anderson et al., 2014). Thus, further investigations are required for level-dependent processes to account for different forms of creativity at individual versus team levels.

Moderating effects of leader optimism and team social competence

The present analysis also demonstrated that leader and team characteristics moderate the distinct predictive relationships between team psychological needs and different forms of team creativity. Specifically, the presence of optimistic leaders relieves high N–Ach members of their concerns related to generating creative ideas that could become potential detriments of goal achievement (Scheier et al., 1994). By contrast, less optimistic leaders who tend to worry about potential setbacks rather than opportunities may constrain the creative actions of teams with high N–Ach members. Given the importance of managerial functions and leader influences on creative processes (Lee et al., 2020; Srivastava & Jaiswal, 2015), team leaders should convey optimism to promote team creativity, particularly when their members have high N–Ach and share cautious, risk-averse default task strategies.

The results did not confirm the expected moderating effects of leader optimism on the team N–Pow and team creativity relationships. MDT suggests that N–Pow is closely aligned with the need for autonomy or an innate desire to be freed from the influence of others and external pressure (Sheldon & Schüler, 2011). Thus, teams with high N–Pow members may repel or even resist directions or influences from others that interfere with and control their behavior. Further studies should identify contextual factors that modify the function of N–Pow for various individual and team outcomes by either increasing or decreasing the self-concordance of a specific behavior.

Our analysis also confirmed that overall team social competence moderates the effects of team N–Aff on team creativity. As hypothesized, the negative relationships between team-level N–Aff and team creativity became positive for radical and incremental creativity when team social competence was high. When teams believe in their competence in constructively dealing with potential interpersonal tension, high N–Aff members are released from concerns regarding social risks arising from creativity (Ferris et al., 2001; Witt & Ferris, 2003).

Although not hypothesized, the results also revealed that team social competence nullifies the positive relationship between team-level N–Pow and radical creativity. Members with high N–Pow compete and offer creative ideas to show superiority and claim power in the team (Park et al., 2017). However, if high N–Pow teams are socially competent and recognize each other's desire for power, then members may adapt their interpersonal strategies to avoid destructive power struggles and reshape interactions to accommodate others' high N–Pow (Chun & Choi, 2014; Mueller et al., 2012). This condition seems to ensure mutually courteous team interactions with reduced group conflict but also seems to diminish contentious and divergent arguments that are necessary for radical creativity (Alexander & Van Knippenberg, 2014). Future studies should further explore the

counterbalancing dynamism between members' power-striving efforts through assertive idea expression and cooperative relationships.

Implications for practice

The current findings offer several crucial implications for practitioners. First, as shown in our analysis, teams composed of members with distinct psychological needs initiate different creative processes toward radical and/or incremental team creativity. Thus, when forming work teams, leaders may consider adequate profiles of members' psychological needs to fulfill specific creative demands for a given team contingent on internal and external situations. The present analysis indicates the utility of members' N−Pow toward radical and incremental creativity. One caveat in recruiting or encouraging N−Pow among members is that leaders must channel members to exercise *socialized* power motive rather than *personalized* one (Steinmann et al., 2020) because only the former leads to energetic prosocial engagement, whereas the latter can destroy teams' social rubric due to highly egocentric and self-serving behavior.

Second, the effects of team members' psychological needs on creativity can be amplified or redirected depending on leader behavior. Thus, providing an appropriate team context and climate that maximizes the benefits of each dimension of team psychological needs is important. Our analysis demonstrates that leaders' optimism eliminates the negative effect of team N−Ach on radical creativity. Such positive leader attitudes and behavior may generate an empowering and entrepreneurial atmosphere for the team (Brueckner et al., in press; Lee et al., 2020) that redirects high N−Ach members' task efforts by removing their fear of risks and failure.

Third, the current analysis also underscores the significance of team interaction processes in shaping the effect of team psychological needs on creativity. High N−Aff members are afraid of challenging the status quo and engaging in creative action because such behavior may cause tension and conflicts. The results confirm that team N−Aff hinders creativity, particularly incremental team creativity. However, our interaction analysis demonstrates that such hindering effects disappear and team N−Aff becomes a positive predictor of radical and incremental team creativity in teams with high social competence. Thus, leaders must train members or function as a role model to enable and encourage positive interpersonal interactions among members so that they can overcome the concerns of social rejection or image risks associated with creative engagement.

Study limitations and directions for future studies

The present results should be interpreted with caution, considering that several limitations are noted for this study. First, team-level psychological needs were operationalized using the average of individual-level scores on the basis of the additive composition model (Chan, 1998). Although the group-level mean was the most widely used approach in forming a group-level construct (Prewett et al., 2018), the mean of individual scores could mask other meaningful information when individual characteristics do not combine additively to form collective resources. Our post-hoc analysis showed the insignificant effects of dispersion (group-level standard deviation) of the three psychological needs. Nonetheless, future studies could consider and use varying operationalizations (e.g., SD, variance, coefficient of variation, minimum, and maximum) other than the group-level average to explore the rich possibilities of team psychological needs.

Second, although we used two different data sources (team leaders and members), the current research design remains limited in that all study variables were collected at the same time and are based on perceptual measures (Conway & Lance, 2010). Although the CFA analysis results supported the validity of the current measures, thereby mitigating measurement concerns, causal inferences cannot be made based on the current data. Leaders and members of the same team may also possibly develop and share informal, implicit cognitions about the relationships among variables, and these cognitions might have affected their responses (Martell, Guzzo, & Willis, 1995). To avoid such implicit bias, future research may expand the current study by using objective indicators and longitudinal data.

On a related note, our team creativity measure was based on leaders' perceptions, which is consistent with prior research (Hu & Liden, 2015; Sung & Choi, 2012). De Dreu and West (2001) noted that leaders have "a good feel for the problems and opportunities their teams faced, and they were well aware of innovations implemented by the team" (p. 1193). Subjective measures of creativity have prevailed in team creativity literature because when studying teams from different organizations performing different specific tasks, assessing team creativity using objective indicators is practically impossible. Nevertheless, future studies may further validate the current propositions using teams performing the same task (e.g., production teams, R&D teams) such that objective measures (e.g., number of improvement suggestions, number of patents, expert ratings on product innovativeness) can be applied to compare creativity across sampled teams.

Third, the current sample of work teams from Korean companies could have affected the empirical findings. Korean culture has strong societal and organizational characteristics toward collectivism, high power distance, and uncertainty avoidance, possibly encouraging employee conformity, group harmony, and rule compliance (Lee & Lee, 2014). The cultural ambiance of Korean organizations could generate a certain degree of negative inclinations against challenging the status quo, thereby setting a low base rate of team creativity. Thus, future research should validate the present framework in other cultural contexts.

Finally, in the current analysis, potential intervening team processes such as social risk concerns, performance pressure, and competitive climate were presumed but not empirically tested. To address this deficiency, future studies should elaborate and verify underlying mechanisms between team psychological needs and team creativity. In this respect, various alternative team emergent states and cognitive processes could be examined, such as psychological safety, reflexivity, intragroup conflict, group trust, and risk-taking tendency. Another intriguing direction could involve the role of knowledge management processes in teams, such as knowledge sharing, shared mental models, and transactive memory systems, which also provide plausible collective mechanisms through which team psychological needs generate different forms of creativity.

The current study could be expanded in several meaningful ways. Future work may use alternative theoretical perspectives, such as trait activation or social exchange theory, to further elaborate the functions of team psychological needs beyond theories of motive disposition and self-concordance. In addition to the average level of members' psychological needs, considering the fit among members or between a leader and members in various motive dispositions could considerably enrich the theoretical perspective. This approach should open the research to a multilevel theory that spans individual, dyad, and group levels of analysis in connecting motive dispositions to creativity and offer practical and customized guidelines for leaders in managing members with disparate psychological needs to improve creativity. Moreover, investigation of macro- and meso-level factors that characterize organizations or teams, such as industry, function, strategy, goal, and environmental contingency, beyond micro-level member-related factors should further advance our understanding of different forms of team creativity.

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