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To Guide or to Divide: The Dual-Side Effects of Transformational Leadership on Team Innovation

Wan Jiang · Qinxuan Gu · Greg G. Wang

Abstract

Purpose This paper investigates the dual-side effects of transformational leadership [i.e., the effects of group-focused transformational leadership (group-focused TFL) and differentiated individual-focused transformational leadership (individual-focused TFL)] on team innovation via team knowledge sharing. The moderating role of team interdependence in the relationship between the dual sides of transformational leadership and team knowledge sharing is also discussed.

Design/Methodology/Approach This paper draws from social identity and contingency perspectives to uncover the mediating role of team knowledge sharing as well as the moderating role of team interdependence. Multi-source data were collected from 242 members and their leaders within 60 R&D teams for use in testing the hypotheses.

Findings The results indicate that group-focused TFL is positively related to team innovation via team knowledge sharing, whereas differentiated individual-focused TFL is negatively related to team innovation via team knowledge sharing. Furthermore, team interdependence plays a moder-

ating role in these relationships: when team interdependence is higher, the positive relationship between group-focused TFL and team knowledge sharing is stronger while the negative relationship between differentiated individual-focused TFL and team knowledge sharing is weaker.

Research Limitations/Implications This paper shows that team knowledge sharing mediates the relationship between both group-focused TFL, differentiated individual-focused TFL, and team innovation. The relationship between group-focused TFL, differentiated individual-focused TFL, and team knowledge sharing varies as a function of team interdependence. The research findings offer practical insights for team leaders to facilitate team knowledge sharing, which in turn fosters team innovation.

Originality/Value This paper proposes and tests group-focused TFL and differentiated individual-focused TFL—team knowledge sharing—team innovation linkage. It offers team leaders guidelines in motivating team knowledge sharing and team innovation.

Keywords Transformational leadership · Team knowledge sharing · Team innovation · Team interdependence · R&D teams

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Introduction

Innovation is a vital factor in the ability of organizations to deal with the complexity of new technologies and information and create sustainable competitive advantage (Eisenbeiss et al. 2008; Gu et al. 2013a). Organizations are increasingly relying on teams, the basic building blocks of modern business organizations, to innovate and respond to changing and challenging environments (Hoch 2013). Team innovation refers to the introduction or application of

ideas, procedures, or processes within a team that are novel and useful to the team (West 1990; Gu et al. 2013b). As the number of organizations using teams as their primary work units increases (Liao et al. 2010), fostering team innovation has become an area of increasing research attention (Eisenbeiss et al. 2008).

A major theme in the innovation and leadership literature has been to conceptualize transformational leadership as a leadership style targeted at innovation. To date, there have been few empirical studies that examine the relationship between transformational leadership and team innovation (Eisenbeiss et al. 2008). Available studies investigating the impact of transformational leadership on R&D team performance or team innovation showed mixed findings. For instance, Keller (2006) reported that transformational leadership was related to R&D team performance, which presumably reflected team innovation. Eisenbeiss et al. (2008) found that transformational leadership was positively related to team innovation only under high levels of team innovation climate.

Although these studies offer valuable insights into the relationship between transformational leadership and team innovation, some areas appear to be lacking in research attention. First, previous leadership research has demonstrated that transformational leadership is not a unidimensional construct (Bass 1985; Kark and Shamir 2002; Zhang et al. in press). According to a dual-level transformational leadership model, the original transformational leadership concept can be divided into group-focused transformational leadership (group-focused TFL) and individual-focused transformational leadership (individual-focused TFL) (Kark and Shamir 2002; Kirkman et al. 2009). Group-focused TFL (i.e., idealized influence and inspirational motivation) comprises leadership behaviors that transform follower values and inspire them to pursue a collective vision, motivating group members to perform beyond their expectations (Bass 1985). Individual-focused TFL (i.e., individualized consideration and intellectual stimulation) comprises leader behaviors that are unique to a particular leader–follower dyad (Zhang et al. in press). Previous research has extensively focused on transformational leadership's effects on the group as a whole and has assumed that all parts of transformational leadership influence group members in similar ways. Little research has examined how group-focused transformational behaviors and differentiated individual-focused transformational behaviors among team members can impact team effectiveness (Zhang et al. in press).

Second, the effects of group-focused TFL and differentiated individual-focused TFL on team outcomes are not only direct, but are also mediated by team processes (Zhang et al. in press). Although researchers have called for more studies of the differentiation process and its

effects on teams (Sparrowe and Liden 1997), to the best of our knowledge, the mechanism underlying the effects of group-focused TFL and differentiated individual-focused TFL on team innovation has not been clearly articulated and empirically tested.

Third, the mixed findings about the effect of transformational leadership on team innovation also indicate that this relationship may depend on contextual factors (Eisenbeiss et al. 2008). Though researchers have argued that differentiated leadership is associated with negative team-level outcomes (Wu et al. 2010), several researchers have indicated that differentiated leader behaviors may not always lead to undesirable consequences (Zhang et al. in press). Therefore, it is important to further examine when leadership differentiation is more or less detrimental for group outcomes by considering various moderators (Wu et al. 2010). Overall, the major omission in the existing research is the examination of how and when the group-focused TFL and differentiated individual-focused TFL simultaneously influence team innovation.

We approached the current study with several goals. First, to answer these calls (Eisenbeiss et al. 2008; Sparrowe and Liden 1997; Wu et al. 2010), we distinguish group-focused TFL and individual-focused TFL. In the team context, the differentiated individual-focused TFL refers to a leader exhibiting varying levels of individual-focused leadership behaviors to different group members, which generally does not target the team as a whole but may affect a wide range of team-outcomes (Henderson et al. 2009; Wu et al. 2010; Zhang et al. in press). We propose that group-focused TFL and differentiated individual-focused TFL may have different effects on team outcomes.

Second, previous research centering on knowledge management (Massey et al. 2002), creativity and innovation (Gilson et al. 2005) has generally demonstrated that team knowledge sharing is an important team process that allows diverse expertise to be "cross-fertilized" among team members for knowledge generation and creative work (Huang et al. 2014). Team members are more likely to generate novel and creative ideas if they are able to access diverse knowledge and information by interacting with others (Huang et al. 2014). The input-process-output model (Shalley et al. 2004) suggests that a group's creative output is a result of the group's processes. Tyler and Blader's seminal work on the group engagement model holds that social identity shapes the degree to which people are motivated to act in ways that benefit their groups (Blader and Tyler 2009). Thus, by integrating the input-process-output framework (Shalley et al. 2004) and social identity perspective (Blader and Tyler 2009), we consider how team knowledge sharing is influenced by group-focused TFL and differentiated individual-focused TFL, and then stimulates team innovation.

Third, as team interdependence is understood to be a critical team characteristic and an important contingency condition (Barrick et al. 2007), we develop a model to jointly examine team knowledge sharing behavior as the mediating mechanism and team interdependence as the moderator. We offer a moderating hypothesis that proposes the relation between differentiated TFL and team knowledge varies as a function of team interdependence.

In sum, we make three main contributions in this study. First, unlike previous studies treating transformational leadership as an overarching construct, this research aims to discover unique leadership insights that may be missed by examining leadership as separate processes at the individual and group levels. Second, it sheds some light on the mediating mechanisms through which group-focused TFL and differentiated individual-focused TFL may affect team innovation. Third, drawing from the contingency perspective, our research findings support the contingency perspective for leadership, which assumes that leadership effectiveness partially depends on the nature of the situation in which leaders and employees affect each other. To increase the theoretical validity and precision of the transformational leadership theory, we use a time-lagged, multisource design in order to avoid the reliance on the same source, cross-sectional design, or both found in previous studies.

Theory and Hypotheses

Group-Focused Transformational Leadership and Individual-Focused Transformational Leadership

Drawing on the self-concept based motivation theory of leadership, Kark and Shamir (2002) proposed the dual-level transformational leadership model which indicated that transformational leadership behaviors can be divided into group level behaviors targeting the group as a whole (i.e., group-focused TFL) and individual level behaviors targeting individual team members (i.e., individual-focused TFL). Group-focused TFL is based on the idea of a collective leadership style, which suggests that effective leaders motivate their followers with the group as a collective, and their influences apply consistently across all members (Wu et al. 2010; Zhang et al. in press). Group-focused TFL behaviors aim to communicate the importance of group goals, develop shared values and beliefs, and inspire unified effort to achieve group goals (Wang and Howell 2010).

Individual-focused leadership is grounded in situational leadership theories and leader-member exchange (LMX) theory (Wu et al. 2010). The central argument of situational leadership theories (Hersey et al. 2001; Wu et al. 2010) is

that leaders need to exhibit different behaviors to fit followers' characteristics and situational factors. LMX theory argues that because leaders have limited time, attention, and resources, they usually assign varying roles to subordinates and treat them differently (Graen and Uhl-Bien 1995; Zhang et al. in press). Hersey et al. (2001) specifically suggested that effective leaders vary their behaviors based on followers' individual differences and contextual factors, resulting in differentiated leadership for team members. Individual-focused TFL behaviors aim to empower individual followers to develop their full potential, enhance their abilities and skills, and improve their self-efficacy and self-esteem (Wang and Howell 2010).

Bass's model identifies four dimensions of leadership that together make up transformational leadership: idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration (Van Knippenberg and Sitkin 2013). Kark and Shamir (2002) proposed a dual-level TFL model and argued that two TFL dimensions, idealized influence and inspirational motivation, emphasized the group identity and linked the self-concept of individuals to the shared values of the group. Accordingly, given the presumably strong overlap between vision, mission, and collective sense of purpose, they are typically highly correlated in the empirical research and are often combined into one "charisma" factor (Van Knippenberg and Sitkin 2013). Thus, drawing on the theoretical definitions of group-focused TFL and extant transformational/charismatic leadership scales (Kark and Shamir 2002; Van Knippenberg and Sitkin 2013; Wu et al. 2010), idealized influence and inspirational motivation are identified as dimensions of group-focused TFL. Specifically, idealized influence refers to behaviors that develop a shared, energizing vision; such leaders manipulate verbal and nonverbal cues that reveal their beliefs, values, sense of mission and purpose, and moral orientation (Bass 1985). Inspirational motivation refers to behaviors that facilitate the vision implementation process. Such leaders serve as role models for perseverance and self-sacrifice to build morale, instill pride in followers, and communicate confidence, which enables followers to achieve goals beyond expectations (Bass 1985).

Individualized consideration and intellectual stimulation, the other two components of transformational leadership, appear to focus more on individual needs, potentials, and capabilities (Kark and Shamir 2002). These two components are expected to build strong connections between the leader and each member, and leaders tend to focus on each follower as a unique individual rather than the follower group as a whole (Wang et al. 2012). According to Kark and Shamir's (2002) dual-level transformational leadership model and the theoretical definitions of individual-focused TFL, these two dimensions are

more likely to be manifested at the individual level and considered as individual-focused TFL (Wang and Howell 2010; Wu et al. 2010; Zhang et al. in press). Specifically, individualized consideration refers to behaviors that value the distinctiveness and uniqueness of each follower by providing necessary assistance, socio-emotional support, and empowerment (Bass 1985; Kark and Shamir 2002). Intellectual stimulation refers to behaviors that highlight problem awareness, encourage challenging underlying assumptions, and appeal to creative solutions (Bass 1985).

Researchers have made similar distinctions between group-focused TFL and individual-focused TFL and shown consistent empirical results (Kunze et al. in press; Wang et al. 2012; Wu et al. 2010; Zhang et al. in press). For instance, Wu et al. (2010) adopted the MLQ scale to measure group-focused TFL (e.g., idealized influence, inspirational motivation) and individual-focused TFL (e.g., individualized consideration and intellectual stimulation). Furthermore, other studies (Kunze et al. in press; Wang et al. 2012; Zhang et al. in press) provide empirical support for the discriminant validity of group-focused TFL and individual-focused TFL.

The Mediating Role of Team Knowledge Sharing in the Relationship Between Group-focused TFL and Team Innovation

Knowledge is a building block for creativity that can be conceptualized as a necessary first step for innovation (Shalley and Gilson 2004). According to the input-process-output model (Mathieu et al. 2008), sharing task-relevant ideas and information among team members is a vital process for team innovation (Srivastava et al. 2006). Knowledge sharing does not happen automatically in a team, and the team leader plays an important role in making it come about (Srivastava et al. 2006). The group engagement model argues that people engage in greater behavioral effort on behalf of the groups with which they identify, as a way of maintaining or reciprocating the group's fulfillment of their social-identity-related needs (Blader and Tyler 2009). Based on the arguments above, we draw on the social identity perspective as an explanation for the mediating roles of team knowledge sharing played in the relationship between group-focused TFL, differentiated individual-focused TFL, and team innovation.

The group engagement model explains that team members with strong social identities based on their team are intrinsically motivated to facilitate the success of their team (Blader and Tyler 2009). Because their team is integrated with their self-concept, these individuals are inherently concerned with their team's welfare and are therefore likely to behave on behalf of the team's interests (Ashforth and Mael 1989). Given the strong positive team climate developed by transformational leaders, members are more likely to share a stronger collective identity within such

teams (Liu and Phillips 2011). Individuals with high level of identification with a team can develop a deep concern with meeting the needs of the team and advancing team goals (Blader and Tyler 2009). In addition, as members develop a stronger sense of team identification, their inherent trust of other members should increase along with their desire to cooperate for the good of the team. Together, these conditions should also contribute to the team psychological safety, which will logically mitigate the interpersonal risks associated with sharing knowledge and ideas with other team members (Liu and Phillips 2011). Therefore, when team members hold shared team goals, they are likely to invest greater concerted effort in effective communication and smooth collaboration (Van Woerkom and Sanders 2010), which stimulate them to share knowledge with each other.

Team members share their knowledge or experiences, which is especially important for the generation of new ideas (Van de Ven 1986). By interacting with other members, individuals can enhance the likelihood of obtaining new knowledge and disclosing new views, which sparks the development of new ideas and the adoption of new ways of doing things (Hülsheger et al. 2009). Sharing ideas, information, and suggestions provides a basis for team members to be involved in the four-stage creative process of identifying a problem, gathering information, generating ideas, and evaluating the outcome (Shalley et al. 2004), which is a viable source of innovation. Hence, based on the above discussion, we argue that team knowledge sharing mediates the relationship between group-focused TFL and team innovation. We thus hypothesize:

Hypothesis 1 Team knowledge sharing mediates the positive effect of group-focused TFL on team innovation.

The Mediating Role of Team Knowledge Sharing in the Relationship Between Differentiated Individual-Focused TFL and Team Innovation

Drawing from the social exchange theory, the quality of the social exchange relationships a member forms with the team supervisor may vary (Liao et al. 2010). Team leaders may adjust their behaviors to followers' individual differences and as a result provide differentiated leadership to the group members. Differentiated individual-focused TFL is a group-level construct and refers to the variation of individual-focused TFL among followers under the same leader (Wu et al. 2010).

Differentiated individual-focused TFL is different from LMX differentiation (Henderson et al. 2009; Zhang et al. in press). Leader-member exchange (LMX) is defined as the reciprocal exchanges between an employee and his/her

supervisor based on trust, respect, and obligations (Graen and Uhl-Bien 1995; Liao et al. 2010). LMX differentiation represents the degree of variability in the quality of the dyadic relationships between a team supervisor and team members (Liao et al. 2010; Le Blanc and González-Romá 2012), whereas the tenet of differentiated transformational leadership argues that effective leaders vary their behaviors on the basis of followers' individual differences (e.g., abilities) and contextual factors (e.g., task structure) (Wu et al. 2010). In addition, LMX differentiation captures the distributions of more general leader–member relationships within groups (Zhang et al. in press). Differentiated individual-focused TFL focuses on the variation in a leader's specific behaviors in groups (Wu et al. 2010). As LMX is often used as proximal consequences of actual leader behaviors, the effects of differentiated TFL on team outcomes could be transmitted via the effects of LMX differentiation (Zhang et al. in press). Previous studies on differentiated leadership have mostly examined the effects of LMX differentiation on team outcomes, while few studies have investigated the roles of differentiated individual-focused TFL (Zhang et al. in press). Thus, in the current study, we focus on the influences of differentiated individual-focused TFL on team knowledge sharing as well as team innovation.

First, a high level of differentiated leadership indicates that a leader behaves differently toward different members. For instance, the leader may spend more time coaching certain members than others, suggest new problem solving methods to some members more frequently than others, or provide intellectual challenges to some followers more than others. Conversely, low levels of differentiated leadership suggest that a leader provides a similar level of direction, support, and challenge for each member in the team. Contrary to arguments about group-focused TFL, research has shown that differentiated individual-focused TFL results in divergence or variation among team members' perceptions of a leader, which is expected to produce differences in outcomes such as members' identification with leader (Wu et al. 2010). The leader identification divergence among team members makes it hard for these teams to set a common goal (Klein and Mulvey 1995), and subsequent team trust is likely to be low. In this situation, team members who have low team goal commitment and team trust may not feel attached to other team members and may be less likely to interact with each other and share knowledge (Hülsheger et al. 2009).

Second, drawing on LMX theory, differentiated individual-focused TFL form relationships with team members differently, those members are likely to be divided into in-group members and out-group members (Sherony and Green 2002; Wu et al. 2010). As social identity theory argues, members are more likely to be influenced by in-group

members, and they are more likely to trust and cooperate with in-group rather than out-group members (Haslam and Reicher 2006). Research also suggests that group members are more willing to share knowledge with individuals they perceive to be similar to themselves (Stasser et al. 1995). Thus, differentiated individual-focused TFL may impede the sharing of constructive feedback or knowledge among team members (Hülsheger et al. 2009).

Third, because of the divergence in team members' identification with leaders introduced by differentiated individual-focused TFL, sub-groups within the team tend to generate their own local orientation and coding schemes. If team members do not share a common coding scheme and technical language, their knowledge sharing or communication will be less efficient and more costly (Kratzer et al. 2004), because communication barriers between subgroups prevent this (Kratzer et al. 2004). To summarize, differentiated individual-focused TFL may play a negative role in the formation of team members' knowledge sharing behavior, leading to low team innovation. Thus, we hypothesize:

Hypothesis 2 Team knowledge sharing mediates the negative effect of differentiated individual-focused TFL on team innovation.

The Moderating Role of Team Interdependence in the Relationship Between Group-focused TFL and Team Knowledge Sharing

As the contingency approach argues, situational factors may place constraints on leader effectiveness. Team members may react differently to the same level of leader behaviors, depending on how they perceive their work context. Within-team interdependence is a defining characteristic of teams and an important contingency condition (Barrick et al. 2007). Therefore, this study proposes that team interdependence moderates the relationship between group-focused TFL and differentiated individual-focused TFL and team knowledge sharing.

Team interdependence is generally seen as an important determinant of the quality of interpersonal interaction (Van der Vegt and Janssen 2003), which has been labeled "cooperation requirements" (Stewart and Barrick 2000). Two basic forms of team interdependence can be distinguished: task interdependence and goal or outcome interdependence. Task interdependence refers to the extent to which team members are dependent on one another to carry out their tasks effectively. Goal or outcome interdependence, describes the extent to which team members' goals are related in such a way that an individual member can only reach his or her goal if the other members achieve their goals as well (Saavedra et al. 1993; Van der Vegt et al. 1999). Although task, goal, and outcome interdependence are

conceptually distinct, it is difficult to disentangle their effects because they tend to be related in practice. Empirical evidence also supports the notion that task, goal, and outcome interdependence tap into a general interdependence factor and support the arguments that they are likely to conjointly influence the degree to which members must work together to perform effectively (Campion et al. 1993). Therefore, our study remains consistent with most previous research on team interdependence as a moderator, in that we examine the overall impact of a composite measure of team interdependence (Gully et al. 2002).

Team members working under conditions of high task interdependence and goal interdependence have to work together and need each other to achieve collective goals (Van Der Vegt et al. 2003). When team interdependence is high, greater communication and cooperation among team members are necessary for goal accomplishment (Liden et al. 2006). In this condition, team members believe that goal attainment by other team members facilitates movement toward their own individual goals (Van Der Vegt et al. 1999). Thus, when group-focused transformational leaders emphasize collective interests and induce team members to transcend their own self-interest for the betterment of the team, team members in high interdependence teams are more willing to communicate and share knowledge with each other. Conversely, if team interdependence is low, there is no need for them to work together or to communicate with each other (Kratzer et al. 2006). These team tasks necessitate less team interaction and are less influenced by team processes because there is little need to communicate or cooperate to perform effectively (Gully et al. 2002). Therefore, members tend to focus on their individual tasks and rarely need to interact with others (Wang and Howell 2010). In this case, even if team leader motives members to focus on collective interests, members may be less motivated to exchange and share knowledge. Hence, the positive effects of group focused transformational on team knowledge sharing may dwindle. Based on the above, we hypothesize:

Hypothesis 3 Team interdependence moderates the effect of group-focused TFL on team knowledge sharing such that the positive effect will be stronger when team interdependence is higher than lower.

The Moderating Role of Team Interdependence in the Relationship Between Differentiated Individual-Focused TFL and Team Knowledge Sharing

Under team interdependence, team members are more likely to jointly diagnose and collaborate to complete a task (Saavedra et al. 1993). Team interdependence requires mutual interactions with group discretion to decide the

particular course of inputs and outputs among members. Interactions may involve an exchange of information, ideas, materials, or other resources (Saavedra et al. 1993). Thus, mutual interactions within teams may enhance mutual trust and motivate members to actively share knowledge within teams. Moreover, since task-interdependent employees work continuously with others who depend on them, they ought to develop a greater sense of responsibility because they see the direct effects of their own actions (Pearce and Gregersen 1991). Positive interdependence has been found to be related to strengthened mutual relationships (Van Der Vegt et al. 1999). As a result, although differentiated TFL may divide team members into subgroups and diminish team-level trust or cohesiveness, team interdependence may break down barriers among subgroups and promote the exchange of information and resources, which may buffer the negative effect of differentiated individual-focused TFL on team knowledge sharing. By contrast, because teams with low levels of interdependence require less coordination among members, communication and cohesion should be less important for effective functioning (Barrick et al. 2007). Hence, differentiated individual-focused TFL will have a much stronger negative effect on team knowledge sharing when team interdependence is lower. Based on the arguments above, we hypothesize that (Fig. 1):

Hypothesis 4 Team interdependence moderates the effect of differentiated individual-focused TFL on team knowledge sharing such that the negative effect will be weaker when team interdependence is higher than lower.

Method

Sample and Procedures

The sample was drawn from four firms in the high-tech industry (including software development, advanced material, and firefighting equipment manufacturing) located in a major city in southern China. Data collection from two different sources was performed over 2 months to reduce the common method bias (Podsakoff et al. 2003). In time 1, team members provided information on their demographics, perceived transformational leadership style of the team leaders, and team interdependence. In time 2 (2 months after time 1), team members rated knowledge sharing behavior within their teams, while corresponding team leaders rated team innovative performance and provided information about their own demographics.

We collected the data through the following procedure. We first met the HR managers of these firms and received their permission to conduct the study in the firms. Then,

Fig. 1 The conceptual model
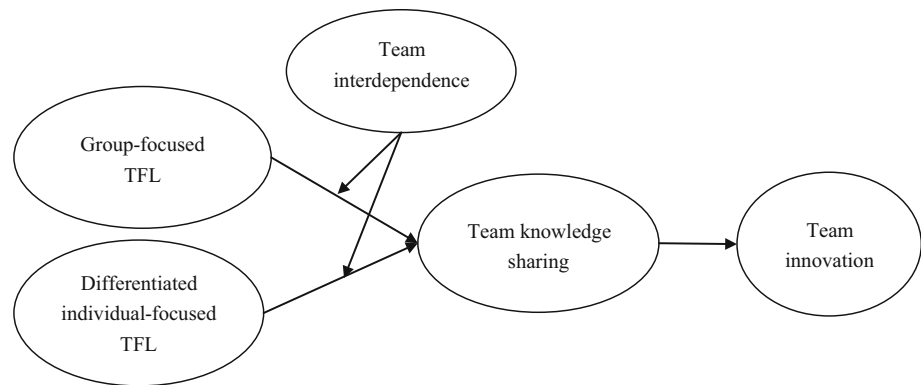
separate questionnaires were distributed to 305 team members within 76 teams and team leaders. The questionnaires were coded before distribution, and the HR staff of each firm helped us to code the matching numbers so that the member–leader relationship can be identified in the responses. All respondents were given time to complete the survey during working hours. The respondents placed their completed surveys in sealed envelopes individually and returned them back to us. In T1, surveys by 270 team members in 70 work groups were returned with a response rate of 88.5 %. Two months later, separate surveys were distributed to those 270 team members and their team leaders. 242 usable responses and 60 completed team leader questionnaires were returned, with response rates of 89.6 and 85.7 %, respectively.

In the sample, team size ranged from 3 to 8. Of the team members, 72.7 % of the respondents were male. The average age was 31 years (SD = 4.74). With regard to education, 4.5 % of the participants reported college or below, 40.9 % of the participants had a bachelor's degree, and 54.5 % of the participants had a master's degree or higher. Of the team leaders, 90.0 % of the leaders were male. The average age was 36 years (SD = 11.11).

Measures

The questionnaires were translated from English to Chinese. To ensure equivalence of the measures in English and Chinese, a translation and back-translation procedure was performed (Brislin, 1980). The reverse-worded items were reverse-coded before empirical analysis. The response scale for all items ranged from 1, "strongly disagree," to 5, "strongly agree."

Group-Focused TFL

We adopted 12 items from the Multifactor Leadership Questionnaires (MLQs) of Bass and Avolio (1995). We focused on the two facets of the MLQ that are theorized to reflect the group-focused component of transformational leadership (Bass and Avolio 1995) and were used in

previous studies (Wu et al. 2010; Zhang et al. in press). To match the conceptualization of group-focused leadership, the wording of the items was revised to emphasize a team referent. This construct was measured with two dimensions: idealized influence (eight items, e.g., "Our team leader goes beyond self-interest for the good of the group") and inspirational motivation (four items, e.g., "Our team leader talks optimistically about the future"). Cronbach's α for this scale was .96.

Individual-Focused TFL

We measured individual-focused TFL with eight items from the MLQs (Bass and Avolio 1995), including individual consideration (four items, e.g., "The team leader considers me as having different needs, abilities, and aspirations from others and intellectual inspiration (four items, e.g., "The team leaders seeks differing perspectives from me when solving problems"). Cronbach's α for this scale was .92.

Team Knowledge Sharing

We adapted the four-item scale from Faraj and Sproull (2000) to measure team knowledge sharing. A sample item is "People in our team share their special knowledge and expertise with one another". Cronbach's α for this scale was .80.

Team Interdependence

Campion et al.'s (1993) nine-item scale was used to measure team interdependence. Sample items include "I cannot accomplish my tasks without information or materials from other members of my team". Cronbach's α for this scale was .93.

Team Innovation

The team leaders were asked to rate the team innovation using a team innovativeness measure developed by Lovelace et al. (2001). The team innovation measure included

the innovativeness of the team's products, the number of innovations or new ideas introduced by the team, the team's overall technical performance, and the team's adaptability to changes. Cronbach's α was .81.

Control Variables

Based on previous studies, the age, gender and educational level of team leaders were our primary control variables. At the team level, we controlled for team size because team size may influence the interaction and dynamics among team members (e.g., Wheelan 2009). In addition, we controlled for team mean tenure, as it captures the experience of members working in a particular team (Zhang et al. 2012).

Aggregation of Group-Level Variables

Consistent with previous research (Kirkman et al. 2009; Wu et al. 2010), we conceptualized group-focused TFL at the team level. To determine whether the aggregation was appropriate, we calculated the intermember agreement (rwg) and reliability (ICC1 and ICC2) indices. The mean rwg was .98, which indicated strong agreement among members within teams (LeBreton and Senter 2008). The rwg values were above the conventionally acceptable rwg value of .70 (James et al. 1993). In addition, ICC(1), ICC(2),were .24, .56 [F (59, 182) = 6.69, p = .001], respectively. Although the ICC(2) value was lower than desired, the small team sizes in the sample may lead to lower ICC(2) values (Bliese 2000). This should not preclude aggregation if aggregation is justified by theory and supported by an acceptable rwg value and significant between-groups variance (Chen and Bliese 2002). Therefore, we proceeded with aggregation (Wang and Howell 2010). ICC1, ICC2, and the mean rwg for the individual-focused TFL were .23, .53 [F (59, 182) = 7.30, p = .001] and .96, respectively. The ICC(2) was less than satisfactory, partly because of the presence of some small groups in the sample. High rwg values and sufficient between-group variances (the significant F test) suggested that data aggregation of the measures was justifiable (Bliese 2000; Klein and Kozlowski 2000; Wu et al. 2010).

Following the suggestions of Wu et al. (2010) and Zhang et al. (2010), we calculated the differentiated individual-focused TFL by dividing the within-group standard deviation of the individual-focused leadership measure by the within-group mean score of the same variable. The larger this value is, the more dispersion there is in the team members' perceptions of leader differentiated behavior, given adjustment for mean differences between groups. ICC1, ICC2, and the mean rwg values for team knowledge sharing behavior were .16, .45, [F (59, 182) = 5.47,

p = .001] and .96, respectively. ICC1, ICC2, and the mean rwg values for team interdependence were .25, .57, [F (59, 182) = 7.24, p = .001] and .97, respectively.

Results

We conducted a series of confirmatory factor analysis (CFA) models to assess a priori factor structures of the scale. In the baseline model, all leadership items were specified to load on their hypothesized factors. Two second-order factors represent individual-focused and group-focused TFL behavior, respectively. As Kelloway (1998) noted, the quality of fit of a theoretical model is based on both whether it provides a good fit to the data and whether it fits better than a competing model. Overall model fit was assessed by the comparative fit index (CFI), incremental fit index (IFI), Tucker–Lewis index (TLI) and root-mean-square error of approximation (RMSEA) (Bollen 1989; Hu and Bentler 1999; Marsh and Hau 1996). CFI, IFL, and TFL were evaluated with the traditional cutoff value of .90 (Hu and Bentler 1999; Marsh and Hau 1996). Reasonable fit is achieved with RMSEA values between .05 and .08 (Browne and Cudeck 1992). The results show a reasonable fit for the baseline model (χ^2 = 397.01, df = 169, RMSEA = .08, IFI = .95, TLI = .94, CFI = .95). All factor loadings were significant at the .01 level. Relative to the baseline model, an alternative model, in which all leadership items were set to load on a single first-order factor, yielded a poor fit with the data (χ^2 = 1,382.275, df = 170, RMSEA = .08, IFI = .71, TLI = .67, CFI = .71). These results support the factor structure of the dual-level leadership scale.

Confirmatory Factor Analyses

Before testing the relationships among the constructs, we assessed their distinctiveness through a series of CFA procedures. Against the baseline model of four factors (Model 1), we examined four alternative models (Models 2–5). As shown in Table 1, the nested models exhibited significantly worse fit than the baseline model, as seen from the significant χ^2 difference tests and model fit indices. The baseline model of four factors showed a satisfying fit (χ^2 = 1,046.71, df = 489, RMSEA = .06, IFI = .91, TLI = .90, CFI = .91). The standardized loadings of all indicators on their specified constructs were significant at the 0.01 level.

Common method variance (CMV) (Podsakoff et al. 2003) is a potential threat to the validity of research findings. Following the suggestions in the literature, we minimized the concerns of CMV in two ways. First, we used Harman's (1960) single-factor test to examine the potential

influence of CMV. Results of our exploratory factor analysis (EFA) using all variables in this study yielded four factors with eigenvalues greater than one that accounted for 68.15 % of the total variance, with the first factor accounting for 37.21 % of the variance. Therefore, a single factor did not emerge and one factor did not account the bulk of the variance.

Second, we compared (1) the measurement model with the addition of an unmeasured latent CMV factor ($\chi^2 = 884.90$, df = 456, RMSEA = .06, IFI = .93, TLI = .92, CFI = .93 and (2) the same measurement model without the CMV factor ($\chi^2 = 1,046.71$, df = 489, RMSEA = .06, IFI = .91, TLI = .90, CFI = .91) and found that the fit indices were not significantly improved (ΔTLI = .02, ΔRMSEA = .00, respectively). Since this measurement model did not significantly improve the fit over our measurement model without a CMV factor, CMV was not a major concern in the research (Bagozzi and Yi 1990).

Descriptive Statistics

Table 2 presents the means, standard deviations, and intercorrelations of all variables in the study. Specifically, as hypothesized, the zero-order correlation between group-focused TFL and team innovation was .71 ($p < .001$). The correlation was $-.44$ ($p < .001$) between differentiated individual-focused TFL and team innovation. The correlation was .49 ($p < .001$) between team knowledge sharing and team innovation. These results were consistent with, and provided initial support for, our hypotheses.

Test of Hypotheses

We conducted a hierarchical multiple regression analysis to test the hypotheses. We tested the mediating hypotheses by following the causal steps outlined by Baron and Kenny (1986). As shown in Table 3, group-focused TFL was positively related to team innovation ($\beta = .64$, $p < .001$) and team knowledge sharing ($\beta = .37$, $p < .01$). Differentiated individual-focused TFL was negatively related to team innovation ($\beta = -.23$, $p < .01$) and team knowledge sharing ($\beta = -.28$, $p < .05$). When team knowledge sharing was entered, the relationship between group-focused TFL and team innovation became less significant ($\beta = .57$, $p < .001$), whereas team knowledge sharing was still found to be positively related to team innovation ($\beta = .20$ $p < .05$). Thus, Hypothesis 1 was supported. When team knowledge sharing was entered, the relationship between differentiated individual-focused TFL and team innovation became weaker ($\beta = -.17$, $p < .05$), whereas team knowledge sharing was still found to be positively related to team innovation ($\beta = .20$, $p < .05$). Thus, Hypothesis 2 was supported.

Although the causal steps strategy is commonly used for assessing mediation, some argue that a significant total effect of independent variable on dependent variable is not necessary (James et al. 2006). Therefore, we reexamined the mediating role of team knowledge sharing using the bootstrap approach, which is more powerful than the causal step procedure for small samples (Preacher and Hayes 2004, 2008). As shown in Table 4, the results indicated that the indirect effect of group-focused TFL on team innovation through team knowledge sharing was significant ($\gamma = .13$, SE = .07, $p < .01$, 95 % CI [.01, .31]). In addition, the indirect effect of differentiated individual-focused TFL on team innovation through team knowledge sharing was also significant ($\gamma = -.42$, SE = .17, $p < .01$, 95 % CI [$-.83$, $-.16$]). As neither CI included zero, Hypotheses 1 and 2 received further support.

Results for the moderator hypotheses are shown in Table 3. The interaction between group-focused TFL and team interdependence was positively related to team knowledge sharing ($\beta = .49$, $p < .001$). We plotted the interaction effects using the procedure of Stone and

Table 1 Comparison of measurement models

Models	Factors	χ^2	df	$\Delta\chi^2$	RMSEA	IFI	TLI	CFI
Model 1	Four factors	1,046.71	489		.06	.91	.90	.91
Model 2	Three factors: Group-focused TFL and individual-focused TFL combined into one factor	2,060.93	492	1,014.22***	.12	.75	.73	.75
Model 3	Three factors: Team interdependence and team knowledge sharing combined into one factor	1,338.60	492	291.89***	.08	.86	.85	.86
Model 4	Two factors: Group-focused TFL and individual-focused TFL combined into one factor; Team interdependence and team knowledge sharing combined into one factor	2,348.06	494	1,301.35***	.13	.70	.68	.70
Model 5	One factor: All variables combined into one factor	3,441.37	495	2,394.66***	.15	.53	.49	.52

* $p < .05$; ** $p < .01$; *** $p < .001$

Table 2 Means, standard deviations, and correlations among all variables

Variables	Mean	SD	1	2	3	4	5	6	7	8	9	10	11
1. Leader age	35.63	11.11											
2. Leader sex	.10	.30	−.02										
3. Leader education	2.47	.89	.09	.01									
4. Team size	4.00	1.07	.13	−.05	−.05								
5. Team tenure	11.15	7.10	.08	.08	−.04	−.01							
6. Group-focused TFL	4.20	.51	.12	.05	.01	.19	.10	(.96)					
7. Individual-focused TFL	3.86	.61	−.19	.04	−.05	−.01	.18	.52***	(.92)				
8. Differentiated individual-focused TFL	.35	.24	−.13	−.11	−.21	.22	.02	−.37**	−.18				
9. Team knowledge sharing	4.19	.45	−.22	−.01	−.16	.01	.24	.47***	.64***	−.32*	(.80)		
10. Team interdependence	3.58	.60	−.23	−.07	−.11	−.27*	−.08	.49***	.62***	−.37**	.67***	(.93)	
11. Team innovation	4.09	.51	.26*	−.17	−.23	−.03	.03	.71***	.47***	−.44***	.49***	.51***	(.81)

Cronbach's alphas are presented in parentheses

* $p < .05$; ** $p < .01$; *** $p < .001$

Table 3 Hierarchical regression results

	Team innovation			Knowledge sharing			
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Control variables							
Leader age	.29*	.20*	.26**	−.23	−.31**	−.14	−.17
Leader sex	−.16	−.22**	−.20**	−.03	−.07	.01	.06
Leader education	−.25*	−.30***	−.26***	−.13	−.18	−.09	.01
Team size	−.09	−.15	−.16*	.04	.03	.23*	.34**
Team tenure	.01	−.04	−.09	.25	.23*	.29**	.35***
Independent variables							
Group-focused TFL		.64***	.57***		.37**	.04	.12
Differentiated individual-focused TFL		−.23**	−.17*		−.28*	−.16	−.05
Mediator							
Team knowledge sharing			.20*				
Moderator							
Team interdependence						.64***	.51***
Interaction							
Group-focused TFL × team interdependence							.49***
Differentiated individual-focused TFL × Team interdependence							.23*
R^2	.16	.73	.73	.13	.41	.62	.70
R^2 change	.16	.56***	.02*	.13	.28***	.20***	.09**
F	2.12	19.57***	19.00***	1.62	5.22***	10.23***	11.60***

* $p < .05$; ** $p < .01$; *** $p < .001$

Hollenbeck (1989). Hence, Hypothesis 3 was supported (Fig. 2).

As shown in Table 3, the interaction between differentiated individual-focused TFL and team interdependence was positively related to team knowledge sharing ($\beta = .23$, $p < .05$). Thus, Hypothesis 4 was supported (Fig. 3).

Discussion

Theoretical Implications

The main contribution of this research is its departure from the common scholarly practice of studying

Table 4 Results of bootstrap analyses on the mediating role of team knowledge sharing

Path	Indirect effect	SE	95 % CI
Group-focused TFL → team knowledge sharing → team innovation	.13**	.07	(.01, .31)
Differentiated individual-focused TFL → team knowledge sharing → team innovation	−.42**	.17	(−.83, −.16)

** $p < .01$
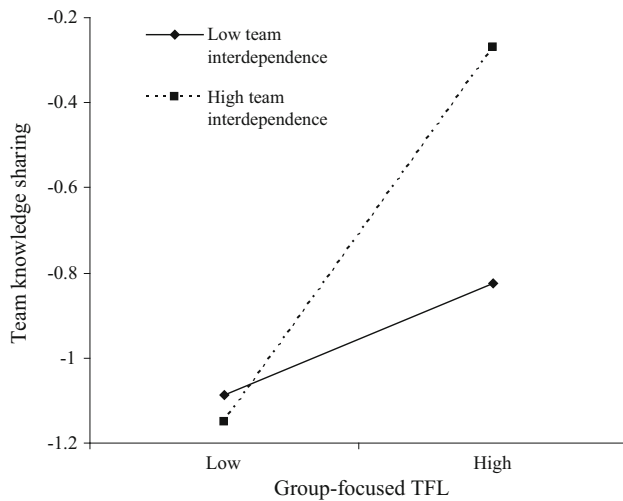
Fig. 2 The moderating effect of team interdependence in the relationship between group-focused TFL and team knowledge sharing
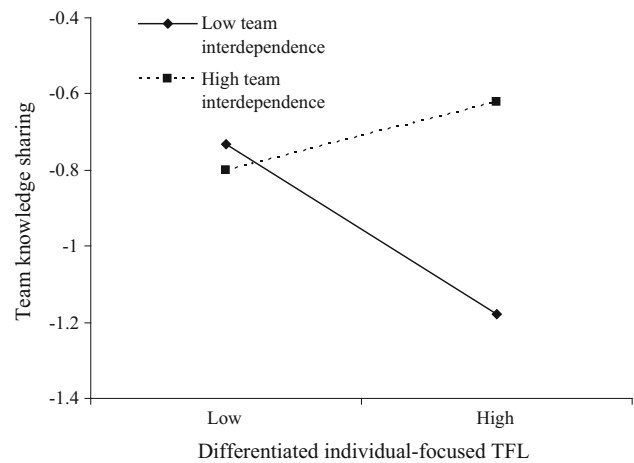
Fig. 3 The moderating effect of team interdependence in the relationship between differentiated individual-focused TFL and team knowledge sharing

transformational leadership as an overarching construct. Instead, it examines the relationship between group-focused TFL, differentiated individual-focused TFL, and team outcomes. Moreover, following conceptual arguments in the field of differentiated leadership research (Kark and Shamir 2002), this is the first study to investigate the relationship between the two types of leadership, team knowledge sharing and team innovation. According to our results, when a transformational leader who demonstrates high levels of all transformational leadership components acts uniformly toward each follower, the followers tend to perform high levels of knowledge sharing and innovation. Wu et al. (2010, p. 101) concluded that "applying situational leadership to different individuals within a group may have unintended consequences for group effectiveness." We extend this finding by showing that displaying varying levels of individual-focused TFL to different members within a group has negative effects on team knowledge sharing and team innovation.

Second, to our knowledge, given the novelty of the differentiated TFL approach to team innovation, few studies have theorized and empirically examined any potential explanatory mechanism for it (Wu et al. 2010). Therefore, by integrating input-process-output framework and social identity perspective, this study

demonstrates team knowledge sharing as a process that links group-focused TFL, differentiated individual-focused TFL, and team innovation. Team knowledge sharing is more proximal in determining team innovation than differentiated leader behaviors. Therefore, our study enriches transformational leadership theory by demonstrating the processes by which the team leader's influence shapes team outcomes. Our findings on differentiated individual-focused TFL suggest that applying situational leadership to different team members may have unintended consequences for team outcomes. These findings shed light on the mechanisms through which transformational leadership may have dual side effects on team innovation.

Third, the findings of Wu et al. (2010) reveal potential trade-offs between treating team members all alike (i.e., demonstrating group-focused TFL) and treating team members differently (i.e., demonstrating high differentiated individual-focused TFL). Our findings resonate with Graen and Uhl-Bien's (1995) contention that leaders should develop high-quality relationships with all followers to increase the perceptions of fairness among employees and to enhance team effectiveness. Our results also lend new and strong empirical support to this argument. Specifically, transformational leaders should show a keen interest in all

team members to stimulate team knowledge sharing and team innovation. Otherwise, team members who are ignored by the leader may undermine the knowledge sharing and innovative performance of the team as a whole. These findings contribute to the ongoing discourse regarding the contradictory results of the relationship between transformational leadership and team innovation.

Last, Wu et al. (2010) highlighted that examining when leader differentiation is more or less detrimental for group outcomes by considering various context moderators is of great importance for leadership research. Consistent with this idea, our study adopts a contingency perspective to answer this call and, further, provides empirical support for the moderating effects of team interdependence. We find that the relationships group-focused TFL and differentiated individual-focused TFL have with team knowledge sharing vary as a function of team interdependence. We address the call of Wu et al. (2010) to explore why and how team inter-dependence affects differentiated leadership. Furthermore, the findings contribute to our understanding of the contingency perspective and of how transformational leadership and team characteristic interact with each other in shaping team behaviors.

Managerial Implications

This study offers several insights for leaders seeking to enhance team innovation. First, our study indicates that team leaders should pay much attention to displaying different sets of behaviors to motivate individual members and teams as a whole. To drive team innovation, leaders need to foster knowledge sharing within teams by emphasizing shared values and collective goals. At the same time, leaders need to encourage cooperation and build trust among members to ensure that they communicate and cooperate effectively as a team (Wang and Howell 2010).

Second, our research findings suggest that team managers should be aware that treating members as separate individuals and applying differentiated leadership may result in some loss of team innovation. Thus, we are not suggesting that team leaders should treat every individual team member in exactly the same manner. Effective leaders should vary their behavior on the basis of followers' individual differences (e.g., cognitive styles) and contextual factors (e.g., task structure) (Wu et al. 2010). However, leaders need to avoid behaviors that give one follower special attention while ignoring others (Wang and Howell 2010). We suggest leaders should attempt to develop high quality relationships with all followers. Otherwise, followers who are ignored by the leader may not only deliver poor individual creativity but may also undermine the innovative performance of the team as a whole.

Our results suggest that managers should use a contingency lens when reconciling the tension between group-focused and differentiated individual-focused leadership. For example, if group tasks require extensive interdependence among members, differentiated leadership might not harm team knowledge sharing and subsequent team innovation. More specifically, it is the cooperative interdependence resulting from high interdependence that enables individual members to exploit the benefits of diverse values, perspectives, and skills in diverse teams at work. With task or goal interdependence, teams could provide platforms and conditions for employees to engage in knowledge sharing and innovative behaviors.

Limitations and Directions for Future Research

Our study has several limitations that point to avenues for future research. The first limitation concerns the measurements of transformational leadership variable in our study. The measurements of group-focused TFL and individual-focused TFL are diverse in extant literature. For example, Wu et al. (2010) and Wang et al. (2012) adapted MLQ (Bass and Avolio 1995) in their studies, while Wang and Howell (2010) adopt a deductive approach to develop an alternative measure of group-focused TFL and individual-focused TFL. The MLQ is the most frequently used and well-validated measure of transformational leadership (Judge and Piccolo 2004). Moreover, (Van Knippenberg and Sitkin 2013, p. 5) indicated that "the dominance of the MLQ in charismatic-transformational leadership research means that to a substantial degree, charismatic-transformational leadership is *de facto* defined as what the MLQ measures." Therefore, in order to answer the call of reconsidering the conceptualization and measures of transformational leadership (Van Knippenberg and Sitkin 2013) and reexamine the relationship between transformational leadership and team innovation from differentiated leadership perspective, we adapted the commonly used MLQ to measure group-focused TFL and individual-focused TFL. Given diverse measurements of group-focused TFL and individual-focused TFL in extant literature, a valuable extension of this research is to empirically test whether the research findings are consistent by using different measures of group-focused TFL and individual-focused TFL.

Second, common-method bias may pose a threat to our results because some of the variables were rated by the same source. We followed the recommendations of Podsakoff et al. (2003) in constructing our survey to minimize such bias and the empirical results also indicated that CMV was not a problem. Multi-wave and multi-source design

should be used by future research to control for the common-method bias.

The third limitation concerns the generalizability of the results. We obtained the data from China in which a culture has different values from Western countries. Although an increasing amount of research is being conducted in China with similar findings to Western context (e.g., Chen et al. 2006; Kirkman et al. 2009), it is important to consider the extent to which our findings may be culture specific. Thus, further research may include culture value dimensions to clarify whether employees with different culture value orientations (e.g., individualism/collectivism) respond to differentiated TFL consistently.

At last, our model did not consider individual differences that may moderate the effects of differentiated individual-focused TFL on employee behaviors. For example, considering the new employees' adjustment to new jobs or organizations (Li et al. 2011), they are more likely to expect individual-focused TFL behaviors than other employees. Thus, drawing on the interactionist perspective, the stage of career may affect employees' reactions to differentiated individual-focused TFL. Further research should use interactionist and multi-level perspective to examine the interactive effects between differentiated individual-focused TFL and individual differences (i.e., the stage of career) in predicting employee behaviors.

Conclusions

In our study, we incorporated two parallel perspectives of transformational leadership, one addressing the collective nature of the team, and the other focusing on the team's individual members. By integrating social identity perspective and contingency perspective, we tested whether, how and when group-focused TFL and differentiated individual-focused TFL may simultaneously influence team knowledge sharing and team innovation. Our research perspectives and results may offer scholars new insights that can help them investigate the roles of group-focused TFL and differentiated individual-focused TFL in organizations. Moreover, our research may benefit practices by providing a new empirically supported framework through which the relationships of group-focused TFL, differentiated individual-focused TFL, and team innovation can be better understood and managed.

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