

An empirical examination of personal learning within the context of teams.

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Keywords: Adult learning, Transformational leadership, Task routineness, Task interdependence

An Empirical Examination of Personal Learning within the Context of Teams

Abstract

Using a sample of 588 employees in 59 work teams, we tested a model that situates personal learning within the context of teams, viewing it as a joint function of teams' leadership climate (i.e., transformational leadership) and task characteristics (i.e., task routineness and task interdependence). Consistent with our hypotheses, we found that the positive relationships between transformational leadership climate and the two dimensions of personal learning (relational job learning and personal skill development) were moderated by the nature of the teams' tasks. Specifically, transformational leadership climate was more strongly associated with personal learning for members of teams working on tasks that were less routine, rather than more routine. However, no significant moderation was found for leadership climate and task interdependence. Our findings underscore the importance of taking into account the contextual conditions within which leadership influence occurs while also demonstrating the potential role that leaders can play in promoting employees' personal learning. Overall, our study bolsters theories that conceptualize adult learning as a transaction between people and their social environments and points to a practical need to match leadership styles with team task characteristics to unleash transformational leadership effects.

An Empirical Examination of Personal Learning within the Context of Teams

Learning refers to a relatively permanent change in a person's repertoire of knowledge and skills produced by the creation of new, or the alteration of existing connections between knowledge structures (Noe, Clarke, & Klein, 2014; Weiss, 1990). Adult learning theories often emphasize a person's transactions with their social environment as the most important conduit through which learning takes place (Kolb 1984; Lave & Wenger, 1991). Rather than viewing learning as the result of one-way information flows from experts to novices, adult learning theories emphasize the value of a person's active involvement in knowledge creation and transformative personal experiences (Kolb, 1984). Studies of workplace learning reflect this perspective by emphasizing informal learning that occurs on the job (e.g., Bear et al., 2008; Van der Heijden, Boon, Van der Klink, & Meijs, 2009) and the development of social "soft" skills such as communication and emotional intelligence (e.g., Blain, 2012; *SHRM*, 2014).

Within organizations, teams have become one of the most salient, if not *the* most salient, aspect of employees' social environments as employers increasingly rely on team-based structures to more efficiently organize production, facilitate innovation, and better serve customers (Cohen & Bailey, 1997; Kozlowski & Bell, 2013; Mathieu, Maynard, Rapp, & Gilson, 2008). Consequently, learning that occurs within work teams can promote ongoing self-development (Kozlowski & Bell, 2008). Yet to date, investigations of workplace learning have focused more on formal training and development programs (Aguinis & Kraiger, 2009; Kraiger & Ford, 2006; Ragins & Kram, 2007), with the assumption that workplace learning mostly involves acquisition of task-related declarative job knowledge. The acquisition of declarative job knowledge is undoubtedly important, but as the boundaries of jobs have blurred and the importance of broadly construed organizational roles has increased (e.g., see Grant & Parker,

2009; Murphy & Jackson, 1999), so too has the need to improve our understanding of the organizational conditions that promote learning that enables employees to perform effectively across a broad range of social contexts.

Through teamwork, employees can improve their personal understanding of how organizational positions and jobs are interconnected with one another and develop skills that improve interpersonal interactions and task performance (Lankau & Scandura, 2002). Such skills are valued by organizations not only because they can contribute to job performance and team effectiveness (Hackman, 2002), but also because they promote employee well-being and may help reduce costly employee turnover (e.g., Dong, Seo & Bartol, 2014). Thus, research that sheds new light on informal personal learning holds considerable promise for improving the design of effective learning environments (cf. Kukenberger, Mathieu, & Ruddy, 2015; Liu & Fu, 2011).

In this study, we focus on transformational leadership in teams as a facilitator of personal learning - based on the premise that novel and stimulating experiences can be generated by transformational leaders when team tasks are non-routine and interdependent. Further, the influence of leaders can be diffused among team members through social contagion, thereby creating a leadership climate that fosters personal learning in teams. Thus, the choice of team-level characteristics examined in this study is based on the central tenet of adult learning theories that emphasizes transformative personal and social experiences triggered by contextual conditions (Kolb, 1984; Kolb & Kolb, 2005).

Our study contributes to current knowledge on adult learning in two ways: First, this study adds to an emerging stream of work that seeks to understand how work team contexts can facilitate or inhibit workplace learning (e.g., see Edmondson, 1999; Kukenberger et al., 2015; Liu & Fu, 2011). Consistent with a constructivist and experiential view of adult learning (Kolb,

1984; Kolb & Kolb, 2005; Lave & Wegner, 1991), we construe teamwork as a social context that provides opportunities for personal learning when the task and leadership climate shape a cycle of personal experience, self-reflection, and readjustment. Further, extending prior research that have focused on the potential for leaders to promote learning by building high quality relationships with individuals (e.g., Carmeli & Gittell, 2009; Ouweneel, Taris, van Zolingen, & Schreurs, 2009; Williams, Scandura, & Gavin, 2009) and creating autonomous and empowering team processes (e.g., Edmondson, 1999; Kukenberger et al., 2015; Liu & Fu, 2011), we examine leadership as a process which can promote personal learning by transforming team members' goals, values and work experiences, as the defining feature of transformational leadership is to transform followers by elevating followers' needs for achievement and self-actualization. As we explain next, experiential theories of adult learning serve as the theoretical base of our model, summarized in Figure 1, for elaborating a new understanding of how transformative conditions present in work teams might contribute to personal learning.

----- Insert Figure 1 about here -----

Theory and Hypotheses

Lankau and Scandura (2002) identify two related but distinct types of personal learning that can occur in work settings: Relational job learning and personal skill development. *Relational job learning* refers to an “increased understanding about the interdependence or connectedness of one’s job to others”, whereas *personal skill development* refers to the “acquisition of new skills and abilities that enable better working relationships” (2002: 780). These two types of personal learning are similar in that both can enhance effectiveness in socially complex work contexts, but the two types of learning are not identical. Briefly, relational job learning encompasses development of mental maps—that is, the organized knowledge

structures that enable employees to recognize relationships among organizational members and more easily predict and understand how others behave (e.g., Rouse & Morris, 1986). In contrast, personal skill development refers to behavioral skills and abilities and is reflected in an improved repertoire of skills that contribute to effective interpersonal interactions and task performance (Liu & Fu, 2011).¹

Extending prior work on personal learning in the mentoring literature, which has focused on the dyadic relationships between mentors and protégés (Lankau & Scandura, 2002; Liu & Fu, 2011), and drawing on adult learning theory (Kolb, 1984; Kolb & Kolb, 2005), in what follows, we examine the cross-level relationships between team-level stimuli and individual-level learning. Because we conceptualize personal learning as resulting novel and transforming experiences fostered by social environments, we first provide an overview of the theoretical foundation of our study.

Experiential Theories of Adult Learning

Experiential theories of adult learning and development argue that personal experiences and the synergistic transactions that occur between a person and the environment are essential for the creation of personalized knowledge (Kolb 1984; Kolb & Kolb, 2005). Accordingly, knowledge is created by “grasping and transforming experience” (Kolb, 1984: 41). The interface that exists where the person and the environment meet is the opportunity space where learning can occur (Kolb & Kolb, 2005) and the interactions that take place within this space are the means through which adults actually do learn. Kolb (1984) described a dynamic learning process starting with a concrete experience that is novel, salient, and stimulating, which then becomes the basis for reflective observations, abstract conceptualizations, and ultimately active

¹ We thank an anonymous reviewer for contributing this point.

experimentation. Through this process, new ideas and insight are formed and validated, which result in relatively permanent changes in a person's repertoire of knowledge and skills and thus represent internalized learning (Weiss, 1990).

Similarly, cognitive learning theories emphasize the role of experience in learning; they suggest that knowledge grows and develops when challenged by novel information obtained through experience. For example, Kanfer and Ackerman's (1989) motivation-based theory of skill acquisition suggests that challenging experiences facilitate personal development by motivating individuals to exert additional effort to acquire the skills demanded of them (McCall & Hollenbeck, 2002). This constructivist, experiential theoretical lens helps explain how personal learning occurs and varies across different contextual conditions.

Conditions that Promote Personal Learning

As illustrated in Figure 1, we treat work teams as a social context that can promote (or constrain) personal learning. In this study, we consider the separate and joint influences of two aspects of this social context—transformational leadership climate and team task characteristics.

Transformational leadership climate and personal learning. Four components of transformational leadership are now widely recognized (Bass, 1985; Judge & Piccolo, 2004): *Charisma, or idealized influence*, is the degree to which the leader behaves in admirable ways that cause followers to identify with him or her. *Inspirational motivation* is the degree to which the leader articulates a vision that is appealing and inspiring to followers; the leader challenges followers with high standards, communicates confidence about goal attainment, and instills meaning into the task at hand. *Intellectual stimulation* is the degree to which the leader challenges assumptions, takes risks, and solicits followers' ideas; the leader transforms followers by changing their cognitive structure, beliefs, and values and encourages creativity. Finally,

individualized consideration is the degree to which the leader attends to each follower's needs, acts as a mentor or coach to the follower, and practices delegation consistent with current levels of the follower's competence and need for growth.

When the leader's transformational behaviors are recurring and observed by the whole team, perceptions and interpretations of the behaviors are likely to converge among members through a social influence process (Gartrell, 1987), thereby establishing a leadership climate (e.g., Chen, Kirkman, Kanfer, Allen, & Rosen, 2007). Once formed, leadership climate comprises diffuse ambient stimuli that shape the experiences of team members, including learning (Gavin & Hofmann, 2002; Hackman, 1992). The transformational leadership climate that exists in a team can create a social space and promote team members' personal learning via multiple theoretical mechanisms.

First, vision-focused leadership (charisma and inspirational motivation) highlights important information and focus team members' attention on what is relevant to achieving team goals (Osborn, Hunt, & Jauch, 2002). As team tasks usually entail understanding of team roles and structures within the team as well as the functioning of other teams, such a leadership climate will likely inspire team members to seek information about how their roles are related and interconnected to others inside and outside the team. Meanwhile, in order to cooperate with one another in accomplishing team goals, members need to attend to, share, and utilize each other's information and expertise. Thus, vision-focused leadership can shape the team's climate that promotes both relational job learning and personal skill development.

Second, a transformational leadership climate provides intellectually stimulating experiences that prompt team members to question their basic assumptions, consider organizational issues, interrelations, connections and problems in a new light, and take on

challenging assignments. In doing so, a transformational leadership climate may trigger exploratory and experimental processes among team members, enhance members' interests in developing an in-depth understanding of their environments, increase their motivation to develop skills for better work relations, and motivate individual members to generate new ideas for task accomplishment (Shin & Zhou, 2003). The formulation of new social understandings and the development of social skills constitute valuable personal learning.

Third, a transformational leadership climate is characterized by a supportive environment in which team members feel their personal needs and concerns are attended to and cared for, because transformational leaders act as mentors and role models who provide coaching and developmental opportunities for members (Sosik, Godshalk, & Yammarino, 2004). Due to their organizational experiences and positions, leaders are often more knowledgeable about performance expectations, normative behaviors, and relationships among key actors. Sharing such information with team members or providing directions for information seeking contributes to members' developmental readiness and facilitates greater breadth and depth of both cognitive and behavioral social learning (Hannah & Lester, 2009) and thus is likely to promote both types of personal learning.

Together, prior theorizing and accumulated evidence suggest that teams with transformational leadership may be more likely to enjoy a social space filled with stimulating and novel experiences that promote personal learning as team members engage in reflection, abstract conceptualization, and active experimentation. Taking a climate perspective, we extend prior work to predict that transformational leadership creates conditions that promote learning for all members of a team, including even those members who have little contact with the leader, for a leader's transformational behaviors shape the experiences of team members both directly

through dyadic interactions and indirectly through social contagion. The learning experiences of any team member promote learning amongst other team members as they work together to accomplish team tasks (see Davis & Luthans, 1980; Lepine & Van Dyne, 2001). Such social contagion effects have been observed for behaviors such as organizational citizenship (Bommer, Miles, & Grover, 2003) and environmentally friendly work behavior (Kim, Kim, Han, Jackson, & Ployhart, in press), but for behaviors likely to contribute to learning. Thus, we propose:

Hypothesis 1: Transformational leadership climate will be positively associated with (a) relational job learning and (b) personal skill development.

Task characteristics and personal learning. Kolb's adult learning cycle notes the importance of learning from novel experiences, which serve as triggers for reflective observations and active experimentation required for learning to occur. Thus, personal learning in teams should be enhanced to the degree that the work provides members with novel or challenging situations and tasks. Two team task characteristics that can promote personal learning are task routineness and task interdependence.

Task routineness, defined as the frequency with which unexpected events occur during task performance and the degree of information processing and role adaptation required by the task (Van de Ven, Delbecq, & Koenig, 1976), may be particularly relevant for personal learning. Non-routine tasks require members to exchange ideas with other team members (Arrow, McGrath, & Berdahl, 2000) and leverage differing perspectives for creative problem-solving and critical thinking (Pelled, Eisenhardt, & Xin, 1999). Dealing with novel and unanticipated situations also stimulates knowledge seeking behaviors that extend beyond team boundaries in the search for external resources and expertise (Ancona, 1990; Chung & Jackson, 2013). Thus, the problem-solving and collaboration needed to successfully perform non-routine tasks are

likely to promote task-related know-how while also improving employees' understanding of how their jobs are interconnected with others' in the workplace.

Furthermore, non-routine tasks often involve challenging assignments that motivate members to experiment with new strategies and behaviors and to achieve new levels of competence (McCauley, Ruderman, Ohlott, & Morrow, 1994; Taris & Kompier, 2005), including those used to handle interpersonal interactions. Over time, such socially-focused competencies, along with task-relevant knowledge, are more likely to grow and develop when team members are challenged by novel information that motivates them to exert additional effort to improve their understanding of the work environment and develop requisite social skills (McCall & Hollenbeck, 2002). In support of the above arguments, previous studies have found positive associations between non-routine, challenging tasks and informal, socially-embedded learning (e.g., Ouweneel et al., 2009). Thus, we propose:

Hypothesis 2: Team task routineness will be negatively associated with (a) relational job learning and (b) personal skill development.

Task interdependence, defined as the extent to which the behavior of one team member influences the performance of other members (Thompson, 1967) and the degree of interactive collaboration required (Tesluk, Mathieu, Zaccaro, & Marks, 1997), can also enhance personal learning as members interact frequently and sometimes in unpredictable ways to accomplish tasks, while navigating through differences in background and perspective (Thompson, 1967). Interdependent team tasks require members to rely on both explicit and implicit coordination to integrate and align the actions, knowledge, and objectives of interdependent members (Rico, Sanchez-Manzanarez, Gil, & Gibson, 2008). Explicit coordination involves sharing information and taking collective actions based on group discussions and decisions, which facilitate the

development of team members' communication and listening skills. Implicit coordination requires team members to formulate expectations and predictions regarding task demands and the actions and needs of others in the absence of directly being notified of these, all of which increase members' awareness of how roles are interwoven and expand their understanding of their work in relation to others.

Furthermore, interdependent tasks bond team members together; teammates are a major source of information and knowledge about task processes, team norms, as well as roles and relationships in the entire organization. Within work teams, broad information sharing can promote personal learning as each member has his or her unique set of work relationships and social ties, providing access to diverse information from different parts of the organization (Baldwin, Bedell, & Johnson, 1997; Reagans, Zuckerman, & McEvily, 2004). Consequently, team members can develop an understanding of the interconnectedness of jobs and functions extending far beyond the team boundary.

In sum, compared with working independently on tasks in isolation, working on interdependent tasks is more likely to prompt team members to search for and share task-related and organizational information and knowledge (Kirkman, Mathieu, Cordery, Rosen, & Kukenberger, 2011), and in the process create concrete social experiences that trigger the adult learning cycle of reflection, abstract conceptualization, and active experimentation, leading to improvements in both relational job learning and personal skill development. Thus, we propose:

Hypothesis 3: Team task interdependence will be positively associated with (a) relational job learning and (b) personal skill development.

So far, we have argued that task routineness and task interdependence can each directly influence personal learning through separate means, but as we explain next, it is possible that,

the combination of task non-routineness and interdependence works synergistically such that the presence of either condition bolsters the influence of the other and thus further enhances the experiential opportunities for personal development.

The experience of working on complex team tasks (e.g., product development teams, medical teams working on complex surgeries, firefighting teams) can be highly transformative and unleash synergistic effects on personal learning. Although it is possible that working on interdependent non-routine tasks may result in conflict that impedes performance and reduces member satisfaction (De Dreu & Weingart, 2003)², the same types of conflict may provide ample learning opportunities for team members. The circumstances of conflict, low morale, and poor performance may be especially powerful triggers of the learning cycle; a team member experiencing these challenging conditions is likely to reflect on the problems, try to understand them, and perhaps take corrective steps to assist the team's eventual recovery. Indeed, learning from failure has been identified to benefit individuals as well as organizations (Ucbasaran, Shepherd, Lockett, & Lyon, 2013), and challenging situations are needed to enable such learning. Thus, regardless of whether or not task interdependence and non-routineness combine to increase team conflict, they increase complexity associated with such tasks, which creates a social space for team members to observe, reflect, act, and react in response to the demands of their work environments and learn in the process. Therefore, we propose:

Hypothesis 4: Task routineness and task interdependence will have a joint interactive effect on (a) relational job learning and (b) personal skill development, such that the greatest learning outcomes will occur when tasks are less routine but more interdependent.

² We thank an anonymous reviewer for this comment.

Transformational leadership climate and task characteristics, in combination. We further propose that the team task characteristics of routineness and interdependence moderate the relationship between transformational leadership climate and personal learning. When a team works on non-routine tasks, the transformational leadership climate experienced by the team can help transform the team's task-based social experience, by encouraging the exploration of new ideas and experimentation with new work procedures in order to meet and exceed performance standards. Furthermore, by encouraging the team to take risks and try new ideas in the accomplishment of non-routine tasks, transformational leadership climate fosters adaptation of the established role structure in the course of task performance (LePine, 2003). Such new experiences prompt team members to reimagine roles and relationships among relevant parties and, over time, develop new behaviors and skills. In sum, non-routine tasks create a rich milieu such that transformational leadership climate can inspire greater engagement with team tasks and, as a result, lead to greater personal learning. In line with these arguments suggesting the augmentation of the transformational leadership climate effect based on the levels of task routineness, we propose:

Hypothesis 5: Task routineness moderates the relationship between transformational leadership climate and (a) relational job learning and (b) personal skill development, such that these relationships are stronger when less routine tasks are performed.

Likewise, task interdependence may act as a contextual condition that strengthens the proposed positive relationship between leadership climate and personal learning. Highly interdependent tasks mandate tight couplings between members and call for greater integration of efforts. A transformational leadership climate can function as such an integrative mechanism by enhancing members' commitment to shared team goals. A transformational leadership climate

inspires team members with a compelling vision that motivates their active engagement. For teams working on highly interdependent tasks, interactions among team members are likely to be more frequent as they coordinate their efforts, seek out needed information, and exchange ideas. The beneficial effects on personal learning of transformational leadership are likely to be especially great in such conditions. Thus, we propose:

Hypothesis 6: Task interdependence moderates the relationship between transformational leadership climate and (a) relational job learning and (b) personal skill development, such that these relationships are stronger when more interdependent tasks are performed.

Method

Sample and Procedure

Study participants were full-time employees in permanent work groups at companies in various industries in China. Members of participating teams represented functions such as production and quality control, research and development, sales and marketing, finance and accounting, and human resources.

Before distributing the survey, semi-structured interviews were conducted with company executives and some team leaders to ensure that members of the participating teams carried out tasks and assignments collectively and were evaluated by some collective outputs, as these are essential characteristics of real teams (Cohen & Bailey, 1997). The questionnaires were hand-delivered to team members and leaders during work hours. The whole procedure was administered by the first author to ensure information confidentiality. A total of 767 team members and 99 team leaders from 99 teams in 30 companies were invited to participate in the survey. Of these, 738 team members (96% response rate) and 98 (99% response rate) team

leaders provided usable responses. The team-level participation rates ranged from 78% to 100% of a team's members; that is, we had complete or nearly complete data for all members of these teams. We retained teams only if at least three members completed the team-level survey, which reduced the sample to 694 members and 76 leaders in 76 teams in 29 companies.

To minimize potential common method variance, we collected data from three sources and adopted a split-team sampling approach. Team leaders provided rating of the team task characteristics—routineness and interdependence. Individual team members provided assessments of the transformational leadership climate and personal learning measures, using split-team random sampling. Half of the members in each team were randomly selected to answer questions regarding leadership using team as the referent (Chan, 1998), and the others answered questions concerning the two types of personal learning. The split-team sampling approach alleviates common method bias as independent and dependent variables are rated by different sources, but it reduces the number of responses at the individual and team level. Another trade-off is that partial responses for computing group-level measures may potentially jeopardize reliability of group means. To ensure measurement reliability for group-level variables, we gave precedence to acquiring the data required to assess team leadership climate (versus the individual personal learning): For teams ($N = 12$) with three to five members, everyone in the team completed the leadership climate survey; for teams ($N = 35$ teams) with six to nine members, we asked five members to complete the leadership climate survey and the others completed the personal learning survey; for larger teams ($N = 29$ teams) of ten or more, half completed the leadership climate survey and half completed the personal learning survey

The split-team random sampling approach yielded a total of 414 members who provided responses for the measure of transformational leadership climate and 280 members who provided

responses for the measure of personal learning. After deleting teams with only team-level survey and respondents with missing demographic information, the final multilevel data analyses included data from a total of 588 individual members in 59 teams in 23 companies from five industries (chemical products, electronics, medical devices, banking, and information technology). Company size ranged from a workforce of fewer than 100 employees ($N = 3$), 100 to 500 employees ($N = 13$), to 500+ employees ($N = 7$), with teams working in such functions as production and quality control (18 teams), research and development (16 teams), sales and marketing (6 teams), finance and accounting (8 teams), and human resources (11 teams). The average team size was 10 members ($s.d. = 3.52$). The team-level participation rates ranged from 78% to 100%, with the average of 94%. Measures of leadership climate for the 59 teams were compiled using data from 335 team members; measures of personal learning were compiled using data from 253 team members. Among 253 members who provided the outcome measure—personal learning, 49 percent were females, 71 percent were between 21 and 35 year old, 58 percent had been with their company for more than five years, and 61 percent had received a bachelor's degree or above).

Measures

All the measures (except transformational leadership which has a Chinese version) were translated and back-translated into Chinese following the procedure by Brislin (1980).

Transformational leadership climate. Following the split-team measurement approach described above, some team members rated their manager's transformational behaviors toward the team. We used Bass and Avolio's (1995) Multifactor Leadership Questionnaire (MLQ) (Form 5X—Short), which includes four sub-dimensions: idealized influence (8 items), inspirational motivation (4 items), intellectual stimulation (4 items), and individual consideration

(4 items). A sample item is “Our manager.....instills pride in *members* for being associated with him or her” ($\alpha = .95$). Respondents indicated the frequency with which each item described their manager using a five-point Likert response scale (from 0, “not at all,” to 4, “frequently, if not always”). Consistent with previous research (Judge & Piccolo, 2004), the four components of transformational leadership based on confirmatory factor analysis (CFA) were highly correlated with each other ($r = .70$ to $.89$), and a model with a higher-order transformational leadership factor fit the data well ($\chi^2 = 559.03$ [$df = 166$, $p < .01$], CFI = $.97$, RMSEA = $.08$, SRMR = $.06$).

In support of aggregating responses to create the climate measure, mean and median r_{wg} values were respectively $.97$ and $.98$, indicating strong agreement among members within teams (James, Demarcee, & Wolf, 1984). We performed a one-way analysis of variance (ANOVA) to examine between-group variability. The ICC(1), ICC(2), and F value were $.20$, $.50$, and 2.0 ($p < .01$). The slightly low ICC(2) value was mainly due to the random split-sample approach we adopted to minimize common method bias: such procedure results in partial (instead of whole) team responses, limiting the actual size (number of members who completed leadership survey) of the team (Bliese, 2000). Given that aggregation is justified by the theory and we found satisfactory within-group agreement and significant between-group variability, we proceeded with aggregation to create our leadership climate variable, acknowledging that results about relationships with team-level transformational leadership might be underestimated (Chen & Bliese, 2002).

Team task characteristics. Managers rated the level of routineness and interdependence of tasks performed by the team using a five-point scale (from 1, “not at all”, to 5, “to a very great extent”). *Task routineness* was measured by four items used in Wong (2004). A sample item is “Most of the tasks our team performs are similar from day to day” ($\alpha = .82$). *Task*

interdependence was measured by three items from Campion, Medsker, and Higgs (1993). A sample item is “Members of my team depend on each other for information or materials needed to perform their tasks” ($\alpha = .75$).

Personal learning. Members who did not rate transformational leadership responded to personal learning questions developed by Lankau and Scandura (2002) using a five-point response scale (1 = strongly disagree to 5 = strongly agree). Items used to assess *relational job learning* ($\alpha = .80$) were: “I have gained insight into how another department functions;” “I have increased my knowledge about the organization as a whole;” “I have learned about others’ perceptions about me or my job;” “I have increased my understanding of issues and problems outside my job;” “I better understand how my job or department affects others;” and “I have a better sense of organizational politics.” Items used to assess *personal skill development* ($\alpha = .82$) were: “I have learned how to communicate effectively with others;” “I have improved my listening skills;” “I have developed new ideas about how to perform my job;” “I have become more sensitive to others’ feelings and attitudes;” “I have gained new skills;” and “I have expanded the way I think about things.”

We examined the dimensionality of the scale with CFA of a two-factor measurement model. Because the measures of relational job learning and personal skill development are unidimensional constructs validated by previous investigations (e.g., Lankau & Scandura, 2002; Liu & Fu, 2011), and in our case item indicators are merely tools that allow us to build a measurement model for desired latent constructs and assessment of whether the two latent learning constructs are distinguishable or overlap to a great extent, we used parcels for more efficient analysis on the relationship between relational job learning and personal skill development (see Little, Cunningham, Shahar, & Widaman, 2002, for a detailed discussion on

parceling practices). Three parcels were randomly created for relational job learning and personal skill development, respectively. The hypothesized two-factor measurement model yield an acceptable fit ($\chi^2 = 30.62$ [$df = 8, p < .01$], CFI = .98, RMSEA = .09, SRMR = .03).

Contrasting the hypothesized model with the single-factor model resulted in significantly better fit for the two-factor model ($\Delta\chi^2 = 69.59, p < .01$), supporting the discriminability of two learning measures.

Control variables. Several variables were included as controls in the statistical analyses: *Team size* (total number of team members, as reported by the team leader) was controlled because of its association with leader behaviors (Bass, 1990). *Average team tenure* and two measures of team diversity were controlled because they can influence team cohesion as well as opportunities to access information and knowledge as well as the level of team cohesion (Jackson, Joshi, & Erhardt, 2003). *Task diversity index* was the average of standardized scores of three diversity indicators (the coefficient of variation for education level, organizational tenure, and team tenure) and *relations diversity* was the average of standardized scores of two diversity indicators (gender diversity measured by proportion of female, and age diversity measured by coefficient of variation). In addition, we controlled for the team's functional areas using a dummy variable (1 = *production*, for production, quality control, and research and development functions; 0 = *support*, for sales and marketing, human resources, finance and accounting functions). Further, we controlled for several individual demographics that might be related to personal learning in teams, including *gender* (1 = female; 0 = male), *age* (20 or under, 21–25, 26–30, 31–35, 36–40, 41–45, 46–50, and 50+), *education level* (middle school, high school or vocational school, two-year college, four-year college, and master or doctoral degree), and

organizational tenure and *tenure in the team* (less than six months, six months to a year, one to three years, three to five years, five to 10 years, and 10+ years).

Analysis

Because our theoretical model consists of constructs spanning both the individual and team level, and the data are nested in teams that are nested in companies, we tested the hypotheses using random coefficient modeling (RCM; also termed hierarchical linear modeling) with version 3.0 of the Nonlinear and Linear Mixed Effects (NLME) program for S-PLUS and R (Pinheiro & Bates, 2000). RCM accounts for the non-independent data structure. We analyzed transformational leadership climate and two task characteristics variables at the team level (level 2) and two personal learning variables at the individual-level (level 1). Further, we controlled for any unmeasured firm-level effects (level 3).

To test hypotheses involving interactions (Hypotheses 4, 5, and 6), we standardized all independent variables to facilitate interpretation of moderations. We added interaction terms after examining main effects, and plotted significant relationships. For the overall model fit, we computed Snijders and Bosker's (1999) pseudo- R^2 ($\sim R^2$).

Results

Descriptive statistics and correlation coefficients for all study variables are reported in Table 1. Hypothesis 1, which predicted that transformational leadership climate would be positively associated with (a) relational job learning and (b) personal skill development, was tested with the main effect models. The results shown in Table 2 indicate that transformational leadership climate was positively associated with relational job learning (Model 2) and personal skill development (Model 5), providing full support for Hypothesis 1a and 1b.

----- Insert Tables 1 and 2 about here -----

We predicted that personal learning would be greater in teams whose tasks were less routine (Hypothesis 2) and more interdependent (Hypothesis 3). Further, we anticipated that personal learning would be enhanced to the degree that team tasks were both non-routine and required relatively more interdependence (Hypothesis 4). As shown in Table 2, looking at relational job learning as the outcome, the coefficients for task routineness, task interdependence, and the interaction (task routineness \times task interdependence) were non-significant (Models 2 and 3), indicating that task routineness and interdependence in and of themselves contribute little to relational job learning. Looking at the results in Table 2 for personal skill development, however, the findings indicate that personal skill development is enhanced when team tasks require greater interdependence and that this effect is stronger for teams working on less routine tasks (Models 5 and 6). We probed the significant interactions following the procedures recommended by Aiken and West (1991). Shown in Figure 2, we found that task interdependence was positively related to personal skill development under conditions of relatively lower task routineness; for more routine tasks, the relationship was negative (simple slope tests: $\gamma = .24$, $t = 4.10$, $p < .01$, with -1 s.d. task routineness; $\gamma = .01$, $t = 0.18$, *n.s.*, with +1 s.d. task routineness), supporting Hypothesis 4b but not Hypothesis 4a.

----- Insert Figure 2 about here -----

Next we examined the combined influences of transformational leadership climate and task characteristics as conditions that promote personal learning. Hypothesis 5 proposed that task routineness would moderate the relationship between leadership climate and (a) relational job learning and (b) personal skill development. Results in Table 2 show significant interaction effects of leadership climate and task routineness on relational job learning (Model 3) and personal skill development (Model 6). The significant relationships illustrated in Figures 3 and 4

indicate that leadership climate was more positively related to relational job learning (simple slope tests: $\gamma = .24, t = 3.34, p < .01$, with -1 s.d. task routineness; $\gamma = .06, t = 1.09, n.s.$, with +1 s.d. task routineness) and personal skill development (simple slope tests: $\gamma = .27, t = 4.18, p < .01$, with -1 s.d. task routineness; $\gamma = .06, t = 1.33, n.s.$, with +1 s.d. task routineness) for tasks that were less routine, providing support for Hypotheses 5a and 5b.

----- Insert Figure 3 and 4 about here -----

Hypothesis 6 predicted that task interdependence would moderate the relationship between leadership climate and two personal learning outcomes. As shown in Table 2, the non-significant coefficients for these predicted interaction effects (Models 3 and 6, respectively) do not support Hypothesis 6.

Discussion

The intent of this study was to examine work teams as immediate social contexts that have the potential to trigger two types of personal learning, namely relational job learning and personal skill development. For a multi-organization, multi-industry sample of employees working in various functional areas, we found that employees working in teams characterized by stronger transformational leadership climates experienced somewhat more relational job learning and personal skill development overall, and further analysis revealed that learning associated with transformational leadership climate was constrained by team task characteristics: The value of transformational leadership climate for promoting learning was evident for employees working on relatively novel (non-routine) team tasks, but not for employees performing relatively routine team tasks, as shown in Figures 3 and 4, respectively.

Contrary to our predictions, the relationships between leadership climate and learning outcomes were not affected by the degree of task interdependence required to perform the team

task, perhaps due to low variability in the degree of interdependence in the teams we observed and a possible ceiling effect (average task interdependence for participating teams was about 4 on a 5-point scale). Before concluding that task interdependence plays no role in establishing a favorable context for transformational leadership to contribute to personal learning, research involving teams working on less interdependent tasks is needed. Likewise, the apparently robust influence of transformational leadership should be interpreted with caution, for the highly interdependent teams we observed may have provided particularly favorable conditions for the types of learning that can occur in the context of transformational leadership climate.

In addition to examining the role of transformational leadership climate in promoting personal learning, we also examined the combined effects on personal learning of task routineness and interdependence in order to assess the possibility that the effects of these task characteristics were intertwined. We found that the association between task interdependence and personal skill development was stronger for individuals working in teams performing non-routine tasks (see Figure 2), suggesting that the learning value of interdependent tasks is amplified for tasks that are novel rather than routine.

Limitations

Before discussing theoretical and practical implications of these findings, we acknowledge that our study is not without limitations. First, as our sample consisted of teams with various functional responsibilities and was drawn from several different companies, there may be extraneous effects due to differences in products, market niches, organizational culture, or human resource management systems. We did not directly examine macro-level contextual effects that might heighten or mask the relationships observed, but we statistically controlled for firm-level effects using hierarchical linear modeling, thus partialing out unmeasured variance.

Second, our cross-sectional design limits the causal inferences we can make. While, it seems implausible that team members' personal learning promotes the development of a transformational leadership climate, longitudinal and/or experimental studies would be useful to establish causality. Finally, although we collected data from multiple sources, our self-report measures of personal learning may be biased if individuals over- (or under-) reported their actual learning. Such systematic bias would likely elevate (and reduce the variance in) reported learning, thereby limiting our ability to observe true relationships. Future research aimed at replicating and extending the findings of this study will be most valuable to the extent it uses more robust research designs and incorporates alternative measurement approaches.

Counterbalancing these weaknesses were several notable strengths, however. In particular, our split-sample design eliminated common method bias as a potential explanation for many of the empirical relationships we investigated. Also, the inclusion of teams working on a variety of tasks in a variety of different companies gives us confidence that our results are likely to be generalizable to a range of organizational contexts. Thus, we believe our findings enrich current understandings of workplace learning, as we discuss next.

Theoretical Implications

Stimulated by a desire to situate adult learning within the experiential context of work teams, we examined team-level leadership climate and task characteristics as contextual conditions that foster personal learning in teams. Although past studies have found some evidence that transformational leadership is associated with knowledge-relevant team outcomes such as creativity and innovation (Jung, 2001; Shin & Zhou, 2003), less is known about the consequences of leadership for the individual learning that occurs through teamwork.

Compared with transactional leadership that is focused on the incremental enhancement and performance on well-defined tasks, transformational leadership stimulates change and promotes creativity and innovation by encouraging followers' cognitive evaluation, experimentation, and behavioral adjustment (Avolio & Yammarino, 2002; Bass, 1985). The current study diverges from past research into such dynamic processes by taking a leadership climate perspective, which delineates how shared perceptions about leaders create a social reality that stimulates and shapes attitudes and behaviors of members through a social information processing mechanism (Salancik & Pfeffer, 1978). Beyond direct interactions with and observations of leaders, we argued that a transformational climate created can be diffused throughout the team by members' challenging each other's views, sharing of information, and enjoying the benefits of socially contagious motivational "bumps". Thus, even members who seldom directly interact with leaders come to share the perceptions of those who are close to leaders, which triggers the cycle of learning such leadership promotes. Our results provide evidence that individual leadership perceptions converge within teams, creating a climate that cascades down to influence personal learning. Given that social interactions within and outside the team create opportunities for learning activities such as knowledge sharing and self-reflection, future research can further our understanding by study the specific interactions that result in personal learning.

The extent to which transformational leadership climate promotes personal learning appears to be somewhat dependent on the nature of team tasks. As we expected, transformational leadership climate was more instrumental for personal learning for teams working on tasks that were less routine. Non-routine tasks enhance the consequences of transformational leadership climate by promoting team members' awareness of their connectedness to others in the

organization and supporting the development of social skills that contribute to better performance and work relationships. These results are consistent with the arguments presented by Bass (1985), who suggested that organic and challenging environments may serve as incubators for transformational leadership effects. In the absence of transformational leadership climate, non-routine tasks might draw members' attention to solitary task requirements (i.e., building technical knowledge and skills) rather than collective knowledge exchange. Future research that simultaneously examines technical and social learning could yield new insights into the role of leadership and task conditions in stimulating these different types of learning.

Our results also contribute to an understanding of adult learning by suggesting that team tasks serve as social incubators for workplace learning. Interdependent team members rely on each other for information, knowledge, and feedback as they pursue common goals, and in the process have many opportunities for self-reflection and active experimentation. The social space created promotes new ideas and skill development related to building and maintaining relationships essential for managing interdependencies while also improving awareness of one's own place and role within the larger organizational context. However, as shown in Figure 2, task interdependence was more likely to promote personal skill development when the team's task was relatively non-routine, for such work requires team members to develop relationships that enable the coordination needed to anticipate and engage in dynamic adjustment (Rico et al., 2008). Such interactions involve developing shared mental models about how to work together (e.g., Mohammed & Dumville, 2001) and may also promote social awareness that enhances personal skill development.

Finally, we note that our results are generally more supportive of the moderation hypotheses pertaining to personal skill development than those for relational job learning. While

relational job learning involves developing a better conceptual understanding of the interdependencies between jobs, personal skill development primarily involves behavioral skills. As both highly non-routine and highly interdependent tasks bring greater complexity in one's job, the result may be that the cognitive task of thinking through and fully understanding how roles and jobs are interconnected becomes more difficult. Hence, whereas the experiences associated with these task characteristics, in conjunction with transformational climate, can lead to improvements in behavioral skills, they may not promote (or may even impede) greater conceptual understanding about the interrelatedness of one's job to others.³

Practical Implications

The practical value of our study lies in its implications for how organizations might establish conditions conducive to individual learning in teams. First, while it is not always feasible or advisable to design team tasks that are interdependent and non-routine, managers should acknowledge the developmental opportunities that exist in such contexts and take advantage of the learning opportunities that naturally exist in such circumstances. For example, one implication of our findings is that training programs and development activities aimed at fostering transformational leadership may be especially effective when they situate trainees in teams working on non-routine, interdependent tasks. Furthermore, organizational practices such as leader selection and appraisal should be recognized as potentially valuable not only for their contributions to task performance, but also for their indirect contributions to the personal learning of subordinates. Organizational practices designed to increase transformational leadership may be especially valuable when teams are responsible for tasks involving knowledge flows and requiring novel solutions, such as research and development and project-based

³ We thank an anonymous reviewer for raising this comment.

consulting work that depend on knowledge-intensive teamwork (Jackson, Chuang, Harden, & Jiang, 2006). In such circumstances, a transformational leader's vision-based inspiration and intellectual stimulation have potential to encourage the team to persevere through challenges and learn from these challenges to achieve outstanding performance.

Further, we echo the arguments presented by Yammarino and his colleagues (2012), who argued that collectivistic views of leadership such as the one adopted for this study suggest that team-based training and development programs may be more effective in promoting personal learning than individual-focused programs. Typically, team-based training programs are conducted with the goal of promoting better teamwork—that is, team development is the objective (e.g., see Salas et al., 2008). The implicit assumption is that the lessons learned are of value primarily for the particular team experiencing such training as a collective whole. Our findings suggest that team-based training might also promote individual-level personal learning that is likely to be useful in a wide range of situations beyond interactions within a specific team.

Finally, our findings have implications for individual employees, who are increasingly expected to take responsibility for their development and career progress. Formal training and credentials can provide some of the skills required for success, but the value of working on challenging team tasks in the context of a transformational leadership climate should also be recognized, for such work experiences appear to present rich opportunities for developing the soft social skills that today's employers often seek but are unable to find. In addition to grasping such opportunities when they become available, employees may find it useful to articulate their personal learning from such experiences as they strive to convince employers that they have the skills needed for the team-based work arrangements that are so ubiquitous in today's organizations.

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TABLE 1
Descriptive Statistics and Correlations

Variable	Mean	s.d.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Mean	s.d.
1. Gender	0.49	0.50																	
2. Age	3.74	1.54	-.06																
3. Education level	3.53	0.84	-.03	-.24**															
4. Organizational tenure	3.99	1.56	.03	.64**	-.29**														
5. Tenure in the team	4.92	5.57	-.01	.60**	-.20**	.59**													
6. Team size	11.56	4.41	-.03	.08	-.03	.00	.18**		.21	-.03	.00	.10	.07	.05	.09			10.00	3.52
7. Average team tenure	5.55	3.90	.04	.41**	-.15*	.34**	.55**	.19**		.05	-.11	-.10	.10	-.07	-.17			5.14	3.47
8. Production team	0.58	0.49	-.07	-.08	.04	.09	-.02	-.28**	-.01		-.05	-.34**	-.23†	-.06	-.16			0.58	0.50
9. Relation diversity index	0.00	0.66	.49**	-.17**	-.04	-.10	-.14*	-.05	-.20**	-.10		.38**	.01	-.27*	-.19			0.00	0.70
10. Task diversity index	0.02	0.65	.00	-.02	-.17**	-.15*	-.02	.18**	-.13*	-.33**	.34**		-.07	-.21	-.03			0.00	0.64
11. Transformational leadership climate	3.82	0.31	.19**	.09	.25**	.06	.03	.27**	.15*	-.27**	.03	-.05	(.95)	-.24†	-.18			3.82	0.31
12. Team task routineness	2.63	0.78	-.18**	-.09	.06	-.03	-.08	.10	-.17**	-.05	-.16*	-.03	-.27**	(.82)	.22†			2.66	0.83
13. Team task interdependence	4.03	0.65	-.06	.18**	-.06	.05	.02	.18**	-.12	-.17**	-.17**	-.03	-.14*	.13*	(.75)			3.99	0.66
14. Relational job learning	3.56	0.52	.03	.13*	-.03	.04	.11	.05	.12	-.22**	.01	.08	.20**	.00	.13*	(.80)			
15. Personal skill development	3.75	0.53	-.05	-.04	.04	-.13*	.03	.07	-.04	-.14*	.04	.11	.11	.04	.14*	.62**	(.82)		

Note. $N = 253$ at the individual level; $N = 59$ at the team level. Individual-level descriptive statistics are shown in the lower-left triangle; Team-level descriptive statistics are shown in the upper-right triangle. Values in parentheses represent scale reliabilities. For individual-level statistics, transformational leadership climate, team task routineness, and team task interdependence were calculated at the team level and then assigned to individuals in each team.

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

TABLE 2
Random Coefficient Modeling Results for Personal Learning

Variable	Relational Job Learning			Personal Skill Development		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Intercept	3.77 (.27)**	3.95 (.28)**	3.98 (.27)**	4.07 (.27)**	4.26 (.28)**	4.29 (.26)**
Gender	-0.01 (.07)	-0.03 (.07)	-0.05 (.07)	-0.08 (.07)	-0.11 (.07)	-0.14 (.07)†
Age	0.01 (.03)	0.00 (.03)	0.00 (.03)	-0.01 (.03)	-0.02 (.03)	-0.03 (.03)
Education level	-0.02 (.05)	-0.04 (.05)	-0.05 (.05)	0.00 (.05)	-0.02 (.05)	-0.03 (.04)
Organizational tenure	-0.01 (.03)	-0.02 (.03)	-0.02 (.03)	-0.06 (.03)*	-0.07 (.03)*	-0.08 (.03)*
Tenure in the team	0.01 (.01)	0.01 (.01)	0.01 (.01)	0.02 (.01)*	0.02 (.01)*	0.02 (.01)*
Team size	-0.01 (.01)	-0.02 (.01)	-0.02 (.01)†	0.00 (.01)	-0.01 (.01)	-0.01 (.01)
Average team tenure	0.01 (.01)	0.01 (.01)	0.01 (.01)	-0.01 (.01)	0.00 (.01)	0.00 (.01)
Production team	-0.23 (.09)*	-0.12 (.09)	-0.08 (.09)	-0.11 (.09)	-0.03 (.09)	0.04 (.08)
Relation diversity index	-0.03 (.07)	0.01 (.07)	0.01 (.07)	0.04 (.07)	0.07 (.07)	0.08 (.06)
Task diversity index	0.05 (.08)	0.09 (.07)	0.13 (.08)†	0.02 (.07)	0.05 (.07)	0.09 (.06)
Transformational leadership climate (TLC)		0.12 (.05)*	0.15 (.05)**		0.11 (.04)*	0.17 (.04)**
Team task routineness (TR)		0.05 (.04)	0.02 (.05)		0.04 (.04)	0.07 (.05)
Team task interdependence (TI)		0.09 (.05)†	0.12 (.05)*		0.10 (.04)*	0.13 (.04)**
TLC × TR			-0.09 (.04)*			-0.10 (.04)*
TLC × TI			-0.04 (.05)			-0.08 (.04)†
TR × TI			-0.02 (.05)			-0.12 (.04)*
$\sim R^2$.10	.15	.16	.09	.15	.17

Note: Coefficient estimates are based on 253 individuals in 59 teams in 23 companies. TLC denotes transformational leadership climate; TR denotes task routineness; and TI denotes task interdependence.

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