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# A Multilevel Model of Transformational Leadership and Adaptive Performance and the Moderating Role of Climate for Innovation

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Audrey Charbonnier-Voirin<sup>1</sup>,  
Assâad El Akremi<sup>2</sup>, and  
Christian Vandenberghe<sup>3</sup>

## Abstract

Using a multilevel framework, we hypothesized that (a) individual perceptions of transformational leadership and (b) team-level transformational leadership climate would be positively related to individual adaptive performance. We also hypothesized that a stronger climate for innovation would enhance the association between transformational leadership and adaptive performance at the individual level. Hierarchical linear modeling conducted on data collected from 120 employees belonging to 35 teams and their managers in an organization operating in the aerospace industry confirmed our predictions. The significance and relevance of these findings for future research on transformational leadership and adaptive performance are discussed.

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<sup>1</sup>INSEEC Bordeaux, Bordeaux, France

<sup>2</sup>Université de Toulouse 1 Capitole, Toulouse, France

<sup>3</sup>HEC Montréal, Montreal, Quebec, Canada

## Corresponding Author:

Christian Vandenberghe, HEC Montreal, 3000 chemin de la Côte-Sainte-Catherine,  
Montreal, Canada, H3T2A7  
Email: [christian.vandenberghe@hec.ca](mailto:christian.vandenberghe@hec.ca)

**Keywords**

transformational leadership, adaptive performance, climate for innovation, multilevel analysis

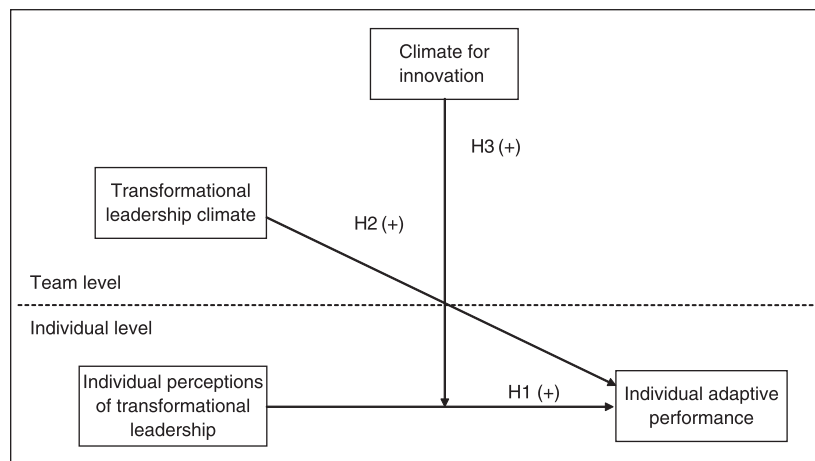
Transformational leadership has been extensively investigated in recent years. In particular, it has been found to influence subordinates' task performance (Dumdum, Lowe, & Avolio, 2002; Judge & Piccolo, 2004) as well as contextual performance and organizational citizenship behavior (Podsakoff, MacKenzie, Paine, & Bachrach, 2000; Wang, Law, Hackett, Wang, & Chen, 2005). In contrast, the role of transformational leadership in promoting followers' adaptive performance, which researchers have found to represent a distinct facet of job performance (e.g., Allworth & Hesketh, 1999; Pulakos, Arad, Donovan, & Plamondon, 2000), has been largely overlooked. This is surprising, as there appears to be intrinsic linkages between the practice of transformational leadership and the emergence of adaptive behaviors (Moss, Dowling, & Callanan, 2009). Indeed, adaptive performance involves the ability to work creatively and learn new skills, the capacity to manage stressful situations, as well as the capability to accommodate diverse social contexts (Han & Williams, 2008; Pulakos et al., 2000; Rosen et al., IN PRESS). These capacities should be particularly well addressed by transformational leaders. Indeed, such leaders present challenging visions of the future that instill commitment, favor the emergence of empowerment in teams, and have been found to enhance outcomes closely related to adaptive performance such as creativity (Shin & Zhou, 2003) and organizational innovation (Jung, Chow, & Wu, 2003).

The primary aim of this study is to propose and test a multilevel model of the relationship between transformational leadership and adaptive performance. In so doing, we recognize that transformational leadership may function at both the individual and the team levels (Kirkman, Chen, Farh, Chen, & Lowe, 2009; Liao & Chuang, 2007; Zohar & Tenne-Gazit, 2008). Specifically, at the individual level, perceptions of transformational leadership refer to leadership behaviors that are experienced and perceived as "discretionary stimuli" and result from differential relationships being developed between leaders and followers (Wang et al., 2005). At the team level, transformational leadership is conceptualized "as a climate variable that is shared among all team members" (Chen, Kirkman, Kanfer, Allen, & Rosen, 2007; p. 333) and represents an ambient stimulus affecting the team as a whole (Chen & Bliese, 2002). Such a team-level climate is reputed to exist as a result of social interactions and of the leader's influence in shaping members' shared assignment of meaning to their environment (Schulte, Ostroff, Shmulyian, & Kinicki,

2009). In definitional terms, individual perceptions of transformational leadership thus refer to a leader's actions directed at specific individuals whereas a transformational leadership climate reflects the extent to which a team has established shared norms regarding the prevalence of transforming actions from the leader such as idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration (see below).

The second purpose of this study was to examine the moderating role of climate for innovation on the relationship of transformational leadership to adaptive performance at the individual level. Given the recurrent call for studying the contextual moderators of transformational leadership (Pawar & Eastman, 1997; Shamir & Howell, 1999), researchers have begun exploring various climate facets as potential moderators of leadership effectiveness (Chen, Lam, & Zhong, 2007; Eisenbeiss, van Knippenberg, & Boerner, 2008; Howell & Avolio, 1993). The present study contributes to this emerging trend by studying how and when transformational leadership influences individual adaptive performance. As our focus was on predicting adaptive performance, we thought that the boundary conditions associated with transformational leadership's effects should be related to the extent to which followers are exposed to norms and practices that encourage flexibility and the expression of ideas and learning. Such a climate is generally referred to as a climate for innovation (Anderson & West, 1998; Eisenbeiss et al., 2008; Scott & Bruce, 1994) and is conceptualized as practices and norms supported by an organization that encourage employees to take initiatives, and explore and develop new ideas, processes, or products that benefit the organization (West et al., 2003). As the core action of transformational leaders involves encouraging employees to broaden their minds and view problems from different angles, developing people to reach higher performance, and energizing them through a challenging vision, such influence should be facilitated when the team has developed practices and norms that encourage personal initiatives, new ideas, and creative thinking. We thus expected the relationship of transformational leadership to adaptive performance to be stronger when climate for innovation is high.

This study adds to the literature on transformational leadership and adaptive performance in three important ways. First, unlike previous work that has focused almost exclusively on individual determinants of adaptive performance (Allworth & Hesketh, 1999; Kozlowski et al., 2001; Pulakos, Dorsey, & White, 2006), the current study shifts the focus on testing the effects of contextual variables such as transformational leadership and climate for innovation on individual adaptive performance. Second, the empirical evidence for the role of transformational leadership at both the individual and team levels in fostering adaptive performance is very scarce. This study breaks new ground by showing that transformational leadership climate may



**Figure 1.** Proposed relationships among the study variables

influence followers' adaptive performance above and beyond the effect of individual perceptions of transformational leadership. Third, this study further contributes to transformational leadership theory by examining important boundary conditions associated with transformational leadership's influence on adaptive performance—in this case, the presence of a climate for innovation. Our research model is summarized in Figure 1. In the next few sections, we elaborate on this model and introduce our hypotheses, then present an empirical study that tests these predictions.

## Transformational Leadership and Adaptive Performance

### *Adaptive Performance*

As the nature of work is changing rapidly, employees' ability to learn new skills and adapt to various contexts becomes a prominent factor that helps organizations attain their objectives. Researchers have generally demonstrated that such adaptive performance is a component of overall performance that can be distinguished from task and contextual performance (Han & Williams, 2008; Johnson, 2001; Pulakos et al., 2000; Rosen et al., IN PRESS). Although Pulakos et al.'s (2000) seminal work in this area has identified eight dimensions of adaptive performance, these components can generally be summarized as employees' ability to (a) work creatively and learn effectively, (b) manage stressful, adverse, unpredictable, and emergency situations, and

(c) accommodate diverse social and cultural contexts (Allworth & Hesketh, 1999; Moss et al., 2009). In more general terms, Johnson (2001; p. 985) defined adaptive performance as “the proficiency with which a person alters his or her behavior to meet the demands of the environment, an event, or a new situation.”

Previous research has mainly focused on individual differences as predictors of individual adaptive performance (Ployhart & Bliese, 2006; Pulakos et al., 2006). For example, general and specific cognitive abilities have been found to influence adaptability (Allworth & Hesketh, 1999; Kozlowski et al., 2001) whereas the Big Five traits of openness to experience, emotional stability, conscientiousness, and extraversion have been demonstrated to be positively related to adaptive performance (Allworth & Hesketh, 1999; Pulakos et al., 2006). Similarly, self-efficacy, coping style, sociability, and goal orientation, have been reported to be involved in the emergence of this type of performance (e.g., Kozlowski et al., 2001; Pulakos et al., 2006).

### **Transformational Leadership**

Surprisingly, adaptive performance has rarely been investigated in connection with contextual variables. Recently, Moss et al. (2009) suggested that transformational leadership subsumes components that all refer to behaviors which should facilitate the emergence of adaptive performance. Bass (1985) conceptualized transformational leadership as comprising four core dimensions. Idealized influence characterizes leaders who represent a trustworthy role model to follow and exert extra effort in novel and complex environments. Inspirational motivation allows leaders to set, articulate, and communicate a compelling vision of the future that empowers followers to take initiatives in changing the organization. Intellectual stimulation enables leaders to encourage subordinates to question beliefs and assumptions, reframe problems, take risks, and look for new ways of doing things. Finally, through individualized consideration, leaders treat followers on a one-on-one basis, focus on their individual strengths, and help them cope with stressful situations (Bass, 1985; Walumbwa, Avolio, & Zhu, 2008; Zhu, Avolio, & Walumbwa, 2009).

All in all, transformational leaders display behaviors that enable subordinates to transcend their self-interests, cope with change, and perform beyond expectations (Bass, 1985; Judge & Piccolo, 2004). This can be so because such leaders appeal to followers' ideals and values, which facilitates commitment to the proposed vision of the work to be done (Piccolo & Colquitt, 2006). In addition, Bono and Judge (2003) suggested that transformational leaders provide meaning to work by promoting higher order values, and as such help followers achieve self-concordance, that is, a psychological state whereby

work activities come to be aligned with one's personal values. By virtue of such self-concordance, individuals come to view their jobs as being self-expressive, resulting in increased self-engagement with work. Self-engagement may also stem from transformational leaders providing a nurturing environment that feeds followers' implicit self-esteem (Moss et al., 2009). Implicit self-esteem is thought to result from the accumulation of personal experiences over an extended period of time and is not dependent on individuals' successes and failures. As transformational leaders' followers are more connected with their deep values and implicit self-esteem, they are less susceptible to the experience of negative emotions that oftentimes accompanies changing, stressful, and flexible work contexts (Moss et al., 2009). The above discussion leads to the following hypothesis:

*Hypothesis 1:* Individual perceptions of transformational leadership are positively related to individual adaptive performance.

At the team level, transformational leadership acts as an overall pattern of behaviors targeted at the entire work unit (Cho & Dansereau, 2010; Liao & Chuang, 2007). Through a social learning process, whereby team members repeatedly interact with their leader and develop a shared perception of the leader's behavior, a transformational leadership climate emerges (Zohar & Tenne-Gazit, 2008). Such climate reflects shared norms regarding the prevalence of transforming actions from the leader (Liao & Chuang, 2007). By virtue of the exposure to such climate and the leader's vision being interpreted in similar terms, team members' individual performance is incrementally enhanced (Chen et al., 2007; Cho & Dansereau, 2010). For example, a team member may want to perform well to get aligned with the team's shared perception that the leader's vision promotes "performance beyond expectations" (Bass, 1985). Thus, although at the individual level transformational leadership enhances employee performance by transforming the attitudes of each individual, at the team level it acts via a climate that embodies a shared understanding of the leader's influence, challenging vision, intellectual stimulation, and individualized consideration. Therefore, transformational leadership climate should exert a cross-level effect on individual adaptive performance. Thus, we pose the following hypothesis:

*Hypothesis 2:* Transformational leadership climate is positively related to individual adaptive performance (i.e., a cross-level effect).

## The Moderating Role of Climate for Innovation

Although theory predicts that transformational leaders will be effective in many different situations and types of organizations (Bass, 1985), some contextual variables may increase the effectiveness of transformational behaviors (Pawar & Eastman, 1997; Shamir & Howell, 1999). As a dynamic social process, leadership does not take place in a vacuum; it develops within a work environment where leader behaviors need to fit circumstances to be effective (Porter & McLaughlin, 2006). Along that line, since the early 1970s, the contingency approach has identified a number of potential moderators of leadership (e.g., Howell, Dorfman, & Kerr, 1986). However, this literature has been fragmented and studies have sometimes yielded mixed results (Podsakoff, MacKenzie, Ahearne, & Bommer, 1995). To address these limitations, several scholars have claimed that researchers should take into account the organizational context (Porter & McLaughlin, 2006) and examine the boundary conditions associated with transformational leadership's effects (Shamir & Howell, 1999; Yukl, 1999).

Among potential moderators of leader effectiveness, organizational climate has recently received attention from scholars (Chen et al., 2007; Eisenbeiss et al., 2008; Howell & Avolio, 1993). Organizational climate is defined as a set of shared perceptions regarding the policies, practices, and procedures that convey messages regarding what is rewarded, supported, and valued in an organization, and is often thought to emerge through social interaction processes at the group level (Kuenzi & Schminke, 2009, p. 637). As a collective phenomenon, work-unit climate drives employees' behaviors by giving them guidelines to make sense of work situations, acting as a source of pressure for desired outcomes (Schneider & Reichers, 1983). Although research has generally examined global organizational climate (Kuenzi & Schminke, 2009), some scholars have recently focused on particular facet-specific climates such as climate for innovation (Anderson & West, 1998; Eisenbeiss et al., 2008; Scott & Bruce, 1994).

The existence of a climate for innovation at the team level should facilitate the action of transformational leadership on promoting individual adaptive performance. A climate for innovation reflects norms and practices that encourage flexibility, the expression of ideas, and learning. It also denotes norms and practices, supported and rewarded by the organization, that value taking charge and adapting to changing contexts (van der Vegt, van de Vliert, & Huang, 2005; West et al., 2003). Employees who work in a climate for innovation are used to get empowered, think on their own, and build on their cognitive and emotional resources to contribute in a creative manner to the



organization's objectives. Therefore, a climate for innovation conveys the message that building on one's inner resources to contribute to the organization's mission creatively and adaptively is a strategic priority for the organization. In such a context, employees' attention is directed to what transformational leaders say and do (Liao & Chuang, 2007). Indeed, via idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration, transformational leaders invite employees to build on their inner strengths and resources to contribute to the organization's mission. Within a climate for innovation, employees interpret the actions of transformational leaders as legitimate, supported and rewarded by the organization. In addition, as they have routinely developed a propensity to use their inner resources creatively, they should view the actions of transformational leaders as fitting with their sense of self-engagement at work (Moss et al., 2009) and self-concordance (Bono & Judge, 2003). Thus, according to self-engagement and self-concordance theories, employees who are exposed to a climate for innovation should strongly benefit from the influence of transformational leaders. To summarize, within a strong climate for innovation, transformational leaders are more likely to successfully enhance subordinates' exploratory and critical thinking processes, incite unconventional thinking, and support subordinates' efforts to act adaptively (Eisenbeiss et al., 2008; Jung et al., 2003).

Empirically, there is some indirect evidence that climate for innovation may moderate the relationship of transformational leadership to adaptive performance. Jung et al. (2003), for instance, found that a climate for innovation enhanced the relationship between transformational leadership and organizational innovation. Similarly, Howell and Avolio (1993) found that climate for innovation positively moderated the relationship of two transformational leadership dimensions, intellectual stimulation, and individualized consideration, to unit performance. Also, Wang and Rode (2010) found that a three-way interaction of transformational leadership, identification with leader, and climate for innovation was associated with employee creativity. Finally, Eisenbeiss et al. (2008) found that the indirect relationship of transformational leadership to team innovation via support for innovation was stronger when climate for excellence—a concept that is akin to climate for innovation—was high. The above discussion leads to the following hypothesis:

*Hypothesis 3:* Team-level climate for innovation moderates the relationship between individual perceptions of transformational leadership and individual adaptive performance such that the effect is stronger when climate for innovation is high.

## Method

### *Sample and Procedure*

The current study surveyed employees and work-unit managers in a large French aeronautic company operating in the design, production, sales, and maintenance of turbines, turbo shafts, and turbojet engines for helicopters, aircrafts, and missiles. The company was a team-based organization such that employees worked in teams on separate projects, and were supervised by managers who had the final responsibility of achieving the team's objective as assigned by management. With the agreement of the company's human resource management director regarding the nature and objective of the study—the director was told it pertained to leadership, work climate, and performance—line managers were informed of the study's objective via face-to-face interviews and allowed to ask questions regarding the survey procedure. This was followed by email exchanges through which any remaining questions were addressed. Line managers were asked to pass the information along to their team members and encourage them to participate in the study. Researchers then contacted employees and managers via email and invited them to respond to a web-based survey. They were informed that the study served research purposes only and that data would remain confidential.

Team members were surveyed about their perception of their manager's transformational leadership and their own adaptive performance whereas team managers were invited to assess climate for innovation. Relying on managers for assessing such climate is consistent with the notion that climate for innovation is an organizational feature that has a strategic focus, for which managers can be considered key informants because of their (a) position in the hierarchical ladder and (b) knowledge of the organization's mission and goals (Schneider & Reichers, 1983). That approach recognizes that managers are well positioned to determine if a number of practices fall within the area of a climate for innovation that has a strategic impact. For example, team activities such as "building scenarios of the future to deal more effectively with expected changes" and "identifying the best opportunities in the environment" (see item description below) can be more accurately assessed as being part of a climate for innovation by managers as they are more cognizant of the organization's strategic needs and orientation.

Survey questionnaires for both employees and managers were coded to ensure responses pertaining to the same teams could be matched. Two weeks after the initial email, a reminder email was sent to managers and team members so as to increase the response rate. In total, 94 managers and 370 team members were contacted for participation in the study. Of these, 78 managers and 256 subordinates provided usable responses to the survey, representing a

response rate of 83% and 69%, respectively. After matching employees with their managers and eliminating work teams from which we received less than 3 responses from employees, the sample comprised 49 managers and 194 team members. We dropped another 14 work teams from this sample because of low agreement among team members on relevant constructs (see Analysis section below), as is common practice in multilevel research (Bliese, 2000). The final sample comprised 120 employees nested within 35 teams and their managers. On average, work teams comprised 3.43 members (range: 3-6). *t* tests of the initial sample ( $N = 49$ ) and final sample ( $N = 35$ ) of work teams found no differences between the samples in terms of demographics and substantive variables. In addition, to determine whether participants' attrition from the initial sample of respondents to the final sample led to nonrandom sampling, we tested whether the probability of remaining in the final sample ( $N = 120$ ) among initial respondents ( $N = 370$ ) could be predicted by demographics and substantive variables (leadership and performance at the individual level; Goodman & Blum, 1996). The logistic regression for this model was nonsignificant and none of the variables predicted the probability of remaining in the final sample,  $\chi^2(4) = 8.92, ns$ .

Within the final sample, managers were primarily men (86%) and were between 32 and 60 years of age, with the average age being 42.5 years. They had worked on average 12 years with their company. Team members had an average tenure of 10 years, and were between 24 and 64 years of age, with the average age being 38.5 years. The majority of team members (84%) were men, which is typical of this industry. Participants were rather homogeneous in terms of education (mainly high school).

## Measures

The survey questionnaire for subordinates contained measures of transformational leadership and individual adaptive performance. A 7-point Likert-type scale (1 = *strongly disagree*; 7 = *strongly agree*) was used for the corresponding items. The manager questionnaire included the climate for innovation measure. Responses were given on a 7-point frequency scale (1 = *never*; 7 = *always*). As the study was conducted in French, items from the single scale which was initially developed in English (i.e., transformational leadership; see below) were translated using a standard translation-back-translation procedure.

**Transformational leadership.** We measured transformational leadership using a 22-item scale developed by Podsakoff, MacKenzie, Moorman, and Fetter (1990), which includes six dimensions: Articulating a vision (five items), fostering the acceptance of group goals (four items), providing an

appropriate model (three items), setting high performance expectations (three items), individualized consideration (four items), and providing intellectual stimulation (three items). To reach an appropriate ratio between number of parameters to be estimated and sample size (5-10; cf. Bentler & Chou, 1987), we used the initial sample of employees ( $N = 370$ ) as the basis for a confirmatory factor analysis of the Transformational Leadership Scale (with maximum likelihood estimation). Although the overall fit of the six-factor model was reasonably good,  $\chi^2(194) = 871.6$ , CFI = .96, RMSEA = .08, the correlations among factors were fairly high (from .64 to .86). We thus decided to treat transformational leadership as a unidimensional construct (e.g., Kirkman et al., 2009). The reliability for this scale at the individual level ( $N = 120$ ) was .93.

*Climate for innovation.* To measure climate for innovation, we developed a six-item scale addressing norms and practices that encouraged employees to generate and implement new ideas, products, and processes (West et al., 1993). These items are reported in the Appendix. Following Conway and Huffcutt's (2003) recommendations, we conducted an exploratory factor analysis (EFA) using a principal axis factoring with promax rotation to examine the structure of these data. The six-item EFA converged on the expected single-factor solution, with all the items loading strongly on the factor (>.60). The coefficient alpha for this scale was .87.

*Adaptive performance.* A scale capturing adaptive performance was specifically developed for this study, based on Pulakos et al.'s (2000) definitions for the eight dimensions of the construct. These dimensions are (a) solving problems creatively, (b) dealing with uncertain and unpredictable work situations, (c) handling emergencies or crisis situations, (d) learning new work tasks, technologies, and procedures, (e) handling work stress, (f) demonstrating interpersonal adaptability, (g) demonstrating cultural adaptability, and (h) demonstrating physically oriented adaptability. In total, 36 items were generated based on the definitions for these dimensions. The items, which were written in French, were then screened by 5 experts in organizational behavior, who judged their accuracy and relevance with respect to the conceptual definitions provided by Pulakos et al. Eighteen employees from the company in which the study was conducted then assessed the items' clarity and readability. This procedure yielded a final selection of 19 items which were used to capture adaptive performance among study participants. Again, following Conway and Huffcutt's (2003) recommendations, we conducted an EFA using principal axis factoring with promax rotation to ascertain whether the 19 items loaded on one or more factors. Five interpretable factors emerged with eigenvalues greater than one. All the items loaded substantially (>.60) on their respective factors. These factors were (a) handling emergencies and unpredictable situations (four items),

(b) handling work stress (three items), (c) solving problems creatively (four items), (d) learning (four items), and (e) demonstrating interpersonal adaptability (four items). Furthermore, using confirmatory factor analysis with maximum likelihood estimation, the overall fit of the five-factor model was good,  $\chi^2(142) = 468.97$ , CFI = .95, RMSEA = .07. However, as factors correlated strongly with one another (from .54 to .72), we treated adaptive performance as a unidimensional construct. This one-factor solution is consistent with related research reporting a single factor capturing adaptive performance (e.g., Han & Williams, 2008). The alpha coefficient for the scale was .87. The final 19-item scale was also cross-validated on two independent samples of employees in a telecommunications company ( $N = 95$ ) and a business services organization ( $N = 133$ ). The five-factor model of adaptive performance yielded a good fit to the data in both samples  $\chi^2(142) = 236.98$ ,  $p < .01$ , CFI = .91, RMSEA = .08, and  $\chi^2(142) = 250.31$ ,  $p < .01$ , CFI = .95, RMSEA = .065, respectively. The alpha coefficient for the overall scale was .84 and .89, respectively. The scale items are presented in the appendix.

**Control variables.** We controlled for employee age, sex, educational level, and organizational tenure in substantive analyses as these variables have been found to be associated with individual adaptive performance (Pulakos et al., 2000).

**Social desirability.** As self-reports of job performance can be affected by social desirability, we used a shortened 10-item scale of the Marlowe–Crowne Social Desirability Scale (Crowne & Marlowe, 1960) to control for this potential effect in employee reports of adaptive performance. The correlation between adaptive performance and social desirability was .15, suggesting that social desirability did not seriously bias employee reports of adaptive behaviors in this study.

## Results

### Confirmatory Factor Analyses

We used confirmatory factor analysis via LISREL 8.80 (Jöreskog, Sörbom, Du Toit, & Du Toit, 2001) and the maximum likelihood method of estimation to examine the dimensionality of our constructs. Because of the small size of our final sample ( $N = 120$ ), we created three-item parcels (i.e., indicators) per construct and randomly assigned items to indicators within constructs (Landis, Beal, & Tesluk, 2000). Using that procedure, we examined whether transformational leadership, climate for innovation, and adaptive performance could be distinguished from one another. Results for the hypothesized three-factor model fit the data well,  $\chi^2(101) = 152.60$ ,  $p < .01$ , CFI = .93, NNFI = .92, RMSEA = .07. That model yielded a significantly better fit than

(a) a model in which the three constructs were combined into a single factor ( $\Delta\chi^2[3] = 409.20, p < .01$ ), (b) a model in which transformational leadership and adaptive performance were combined ( $\Delta\chi^2[2] = 100.80, p < .01$ ), (c) a model that merged transformational leadership and climate for innovation ( $\Delta\chi^2[2] = 308.40, p < .01$ ), and (d) a model that combined climate for innovation and adaptive performance in one factor ( $\Delta\chi^2[2] = 179.40, p < .01$ ). These results support the discriminant validity of the measures of transformational leadership, adaptive performance, and climate for innovation in this study.

### *Common Method Variance Considerations*

Because responses to the transformational leadership and adaptive performance items were collected from the same source at the same time, the relationship between the two measures could be inflated because of common method variance. To counteract this potential bias, we followed Podsakoff, MacKenzie, Lee, and Podsakoff's (2003) statistical and nonstatistical recommendations (e.g., separating predictor and criterion variables sections in survey questionnaires and ensuring response anonymity). On the statistical front, we added an orthogonal latent common method factor to the hypothesized two-factor model including transformational leadership and adaptive performance to assess the potential increase in model fit that would be gained from accounting for this unmeasured method factor (as mentioned above, three-item parcels were created). That model yielded a reasonably good fit ( $\chi^2[23] = 46.55, p < .01, CFI = .96, NNFI = .95, RMSEA = .08$ ), yet was not significantly different from a model that did not include the method factor ( $\Delta\chi^2[11] = 17.11, ns$ ). Moreover, the method factor accounted for only 17% of the total variance, which is lower than the median amount of method variance (25%) reported in studies of self-reported perceptions at work (Williams, Cote, & Buckley, 1989). In addition, the correlation between transformational leadership and adaptive performance remained virtually the same whether the method factor was included or not in the model. Overall, these results suggest common method bias alone could not explain the relationship between transformational leadership and adaptive performance in this study.

### *Aggregation Analyses*

To justify the creation of aggregate scores of transformational leadership at the team level, we calculated interrater agreement on this measure using the  $r_{wg(j)}$  index (James, Demaree, & Wolf, 1984). The mean  $r_{wg(j)}$  value for transformational leadership at the team level was .80 (range = .75-.88) which is above the commonly used .70 threshold (Bliese, 2000) and reveals strong

agreement among team members on this construct. We also examined the intraclass correlations (ICC[1] and ICC[2]) of transformational leadership. In this case, ICC(1) estimated the proportion of variance between participants that could be accounted for by differences in team membership, whereas ICC(2) estimated the reliability of the aggregate transformational leadership scores at the team level (James, 1982). The ICC(1) value for transformational leadership was .24, which is well above the median value of .10 for ICC(1) reported in previous reviews of multilevel research (e.g., Bliese, 2000). The ICC(2) value for transformational leadership was .52. This value compares favorably with estimates reported in prior studies of this type (Schneider, White, & Paul, 1998).

### *Descriptive Statistics and Correlations*

Table 1 reports the descriptive statistics and correlations for the study variables at the individual level. Of interest, transformational leadership was significantly related with adaptive performance ( $r = .44, p < .01$ ), while climate for innovation was not ( $r = -.10, ns$ ). Also noteworthy is the fact that transformational leadership and climate for innovation were unrelated to one another ( $r = .06, ns$ ).

### *Hypothesis Testing*

As our data spanned two levels of analysis, with individual perceptions of transformational leadership being nested within teams and their managers, the requirement of independence of data was not met (Hofmann, Griffin, & Gavin, 2000). Hierarchical linear modeling (HLM), which explicitly accounts for the nested nature of data, was thus used to analyze the data (Raudenbush & Bryk, 2002). Using a "slopes-as-outcome" HLM model, we examined (a) the impact of individual perceptions of transformational leadership (Level 1) and of transformational leadership climate (Level 2) on individual adaptive performance and (b) the cross-level interaction effect of climate for innovation on the relationship between individual perceptions of transformational leadership and individual adaptive performance. Level 1 variables were grand-mean centered, as is often recommended (e.g., Hofmann et al., 2000).

Table 2 presents the results of the HLM analyses. As can be seen, both individual perceptions of transformational leadership and leadership climate were significantly and positively associated with individual adaptive performance ( $\gamma_{10} = .42, p < .01$ , and  $\gamma_{01} = .27, p < .01$ , respectively). Therefore, Hypotheses 1 and 2 are supported. Hypothesis 3 proposed that climate for innovation would moderate the relationship of individual perceptions of

**Table 1.** Descriptive Statistics and Correlations for the Study Variables

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7
1. Sex	0.16	0.37	—						
2. Age	38.54	9.41	-.22*	—					
3. Tenure	9.66	10.24	-.14	.62**	—				
4. Educational level	3.22	1.34	.06	.44**	-.54**	—			
5. Transformational leadership	5.42	0.62	-.02	.11	.05	.07	(.93)		
6. Climate for innovation	4.60	0.89	.02	-.03	-.07	.12	.06	(.79)	
7. Adaptive performance	5.37	0.50	-.13	.19*	.10	.03	.44**	-.10	(.87)

Note:  $N = 120$ . Alpha coefficients are reported in parentheses on the diagonal. For Sex, 0 = male, 1 = female. Age and Tenure are measured in years. For Educational level: 1 = secondary school, 2 = college, 3 = certificate, 4 = bachelor's, 5 = master's, 6 = doctorate. Team-level climate for innovation scores are assigned to all members belonging to the same team.

\* $p < .05$ . \*\* $p < .01$ .

transformational leadership to individual adaptive performance such that the effect would be stronger when climate for innovation is high. As can be seen from Model 3's results in Table 2, the cross-level interaction between individual-level transformational leadership and climate for innovation in predicting individual adaptive performance was significant ( $\gamma_{21} = .18, p < .01$ ).

To understand the form of this interaction, we plotted the regression line of adaptive performance on individual perceptions of transformational leadership at 1 *SD* below and 1 *SD* above the mean of climate for innovation (cf. Aiken & West, 1991). The regression line for transformational leadership on adaptive performance was significantly positive under conditions of high climate for innovation,  $t(92) = 5.67, p < .01$ , and also significant under conditions of low climate for innovation,  $t(92) = 2.19, p < .05$ . Post hoc probing of this interaction showed that the slopes of the regression lines differed significantly from each other,  $t(92) = 2.49, p < .01$ . Figure 2 presents a graphic depiction of this interaction. As can be seen, the relationship between perceptions of transformational leadership and adaptive performance is stronger under a high climate for innovation. Hypothesis 3 is thus supported.

## Discussion

The present study found a positive relationship between transformational leadership and adaptive performance at the individual level of analysis. In addition, team-level transformational climate exerted a positive cross-level



**Table 2.** Results of Moderated Hierarchical Linear Modeling Analysis Predicting Individual Adaptive Performance

Variable	Model 1	Model 2	Model 3
<b>Level 1</b>			
Intercept	5.39**	5.40**	5.40**
Sex	-0.13	-0.14	-0.13
Age	0.01	0.00	0.00
Tenure	0.00	0.00	0.00
Educational level	0.03	0.03	0.03
Transformational leadership ( $\gamma_{10}$ )	0.39**	0.40**	0.42**
$R^2$ within-groups	0.21	0.21	0.23
<b>Level 2</b>			
Cross-level main effects			
Transformational leadership climate ( $\gamma_{01}$ )		0.27**	0.26**
Climate for innovation ( $\gamma_{02}$ )			-0.04
Cross-level interaction effects			
Climate for innovation ( $\gamma_{21}$ )			0.20**
$R^2$ between-groups		.05	.14
Model deviance	173.85	173.05	172.61

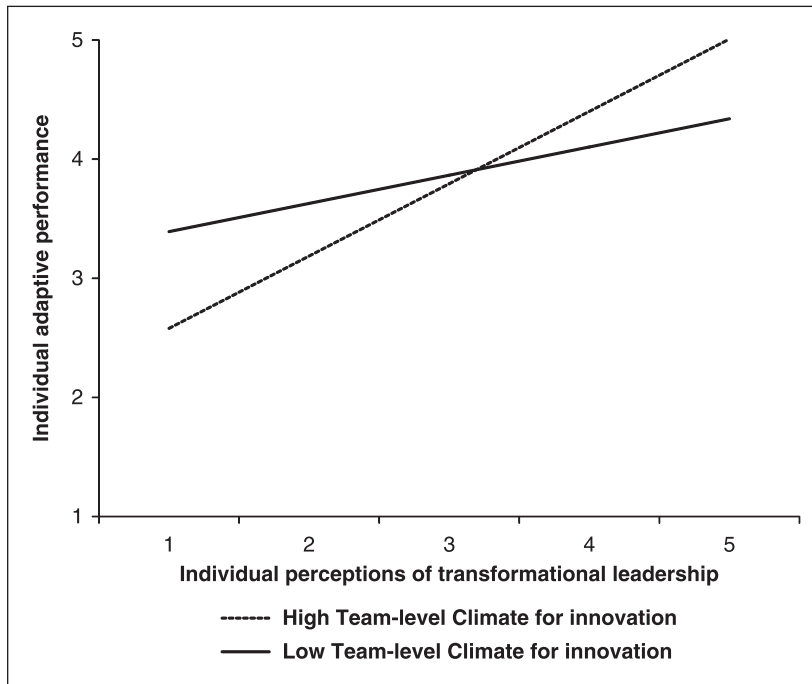
Note: For Level 1,  $N = 120$ , for Level 2,  $N = 35$ . For Sex, 0 = male, 1 = female. Age and Tenure are measured in years. For Educational level: 1 = secondary school, 2 = college, 3 = certificate, 4 = bachelor's, 5 = master's, 6 = doctorate. Entries corresponding to the predicting variables are estimations of the fixed effects.

\*\* $p < .01$ .

effect on individual adaptive performance. Finally, team-level climate for innovation moderated the relationship of individual perceptions of transformational leadership with adaptive performance. This study thus sheds light on the influence process of transformational leadership on adaptive performance. Our findings provide several implications for research and practice.

### Research Implications

Findings contribute to extend knowledge in several important ways. From a theoretical perspective, results are consistent with the view that individual perceptions of transformational leadership and leadership climate serve the same function across levels, that is, to increase individual adaptive performance. A direct implication of this functional homology is that leaders can address team members' motivation to perform by simultaneously developing personalized relationships with members and targeting the team as a whole



**Figure 2.** Interaction between individual perceptions of transformational leadership and team-level climate for innovation in predicting individual adaptive performance

(Wu, Tsui, & Kinicki, 2010). In other words, as is recognized by conventional wisdom, a leader can successfully act on (adaptive) performance both by inspiring the group as a whole and by being attentive to individual needs. This can be done by developing practices that foster acceptance of group goals and team-based decision making, and concomitantly encouraging self-management in the performance of one's duties and work role. As an expression of ambient (leadership climate) and discretionary (individualized leadership) stimuli, such practices are likely to influence the motivational states that presumptively lead to adaptive performance. As an extension, our study also revealed a cross-level effect of leadership climate on individual adaptive performance. This suggests that collectively shared norms and practices of transformational leadership add substance to individual perceptions in shaping adaptive performance at the individual level.

Second, this study breaks new ground in extending the criterion domain associated with transformational leadership to adaptive performance. Although Moss et al. (2009) stressed the importance of leader processes and characteristics for

generating adaptive performance in dynamic work settings, theory and research regarding this topic have been limited. Empirically, previous research has mainly focused on the individual variables which lead to adaptive performance. For instance, Han and Williams (2008) investigated the role of employee continuous learning orientation whereas Lepine, Colquitt, and Erez (2000) examined cognitive ability, conscientiousness, and openness to experience as predictors of adaptive performance.

On the theoretical front, our investigation of the role of transformational leadership in adaptive performance is rooted in recent developments regarding the psychological processes through which such leadership impacts individuals' behavior. As highlighted by Bono and Judge (2003), transformational leaders typically enhance followers' self-concordance by promoting higher-order values, i.e., values that transcend individual needs. Self-concordance is a psychological state whereby the individual comes to view work activities as being aligned with his or her personally held values. That state of self-concordance makes self-engagement with work easier to emerge and also potentially allows individuals to act according to their implicit self-esteem (Moss et al., 2009). As Moss et al. rightly suggested, transformational leaders' actions feed followers' implicit self-esteem. Indeed, such leaders provide an attractive vision of the future, consider individual needs, and stimulate followers to use their full creative potential. These actions should help followers build on their inner resources and act in accordance with their implicit self-esteem when they are faced with difficult situations. The capacity to use one's implicit self-esteem in work situations is an important basis for adaptive performance because the inner self-esteem is not dependent on external contingencies and the varying emotions they induce, thus allowing individuals to remain positive and optimistic in the face of changing, stressful, and flexible work contexts (Moss et al., 2009)—a core aspect of adaptability.

A third contribution of this study stems from the inclusion of climate for innovation as a moderator of the relationship of transformational leadership to adaptive performance. This suggests that leaders should be cognizant of the fact that transformational actions are more efficient when the work context is conducive to norms, practices, and resources that promote innovation. The moderating effect of climate for innovation also clarifies the boundary conditions associated with the effectiveness of transformational leadership as a driver of employee adaptability. The central argument of situational leadership theories (e.g., Howell et al., 1986) has been that leaders need to display behaviors that fit the context. More recent calls have also been addressed regarding the need to explore potential moderators of transformational leadership (e.g., Pawar & Eastman, 1997; Porter & McLaughlin, 2006; Shamir &

Howell, 1999; Wang & Rode, 2010). Our results suggest these calls are justified and echo Liao and Chuang's (2007) contention that "strategically focused leadership behaviors have stronger effects than generic leadership behaviors on employee attitudes and behaviors in achieving a specific strategic goal" (p. 1016). That is, climate for innovation provides "a strategic focus" for transformational leadership that facilitates the leader's action in promoting adaptive performance. Within a strong climate for innovation, employees view the actions of transformational leaders as legitimate and appealing to their sense of self-engagement (Moss et al., 2009) and self-concordance state (Bono & Judge, 2003) which results in stronger adaptive performance.

### *Practical Implications*

The current study offers several implications for practice. First, our results highlight the complementary means by which managers can encourage team members, personally and collectively, to learn and adjust effectively to changing situations. In this regard, Wu et al. (2010) demonstrated that individualized consideration and intellectual stimulation were the dimensions of transformational leadership most suitable for actions at the individual level whereas idealized influence and inspirational motivation are more group focused. Given this, leaders may want to use "customized coaching," which can be achieved through recognizing each person's unique talents and skills and then providing individualized learning opportunities and support. Similarly, a leader can arouse each individual's innovative potential and critical thinking by adjusting his or her action to that individual's capabilities and intelligence. These behaviors will likely create a trustful relationship between the leader and each follower. In contrast, the leader may treat individuals collectively as a group when articulating a challenging vision of the future (idealized influence) and raising followers' expectations and reinforcing their confidence in their ability to reach ambitious goals (inspirational motivation; Cho & Dansereau, 2010; Wu et al., 2010). As these dimensions are not specifically "customized" to each follower's needs and competencies, they more readily act at the group level.

This study's results also show that leaders' behaviors are more effective when they are supported by a consistent organizational climate. In essence, organizations can find value in promoting a combination of transformational leadership and climate for innovation as it results in an increase in individual and team adaptability, the latter being thought as one of the best ways of helping organizations to remain competitive in an era of constant change (Burke, Pierce, & Salas, 2006; Han & Williams, 2008; Ilgen & Pulakos, 1999; Pulakos

et al., 2000; Rosen et al., IN PRESS). However, for such a management strategy to be effective, it is likely that team leaders need to be empowered to develop a transformational leadership style. In other words, decisions would need to be delegated at the team level so that both team leaders and followers benefit from some latitude in developing their creative potential to face the changing nature of work (Kotter, 1996).

### *Limitations and Future Research*

This study has limitations. First, responses on transformational leadership and adaptive performance items were obtained from the same source (i.e., employees) at the same time. This may have caused observed relationships to be inflated. Similarly, we cannot exclude the possibility that relationships go in the opposite direction (from adaptive performance to transformational leadership). To overcome this critical limitation in our study, future research should try to replicate our findings using supervisor ratings of adaptive performance. However, we took steps in dealing with issues of both social desirable responding and common method variance. Using a standard measure of social desirability, we found no evidence that responses on leadership and performance were influenced by such a bias. In addition, we followed Podsakoff et al.'s (2003) recommendations and examined whether an unmeasured method factor would account for significant variance in our constructs. Results revealed this was not the case. In addition, it should be noted that climate for innovation data were obtained from supervisors, thereby excluding common method variance as an issue in testing its moderating effect on leadership–performance relationships. Still, as our study was cross-sectional in nature, it is not possible to determine whether transformational leadership causes adaptive performance or vice versa. For instance, it might be that employees who perform more adaptively are prone to view their manager as exhibiting more transformational leadership. Clearly, longitudinal studies that replicate similar measurements at different points in time would allow closer examination of the issue of causality among constructs.

Second, our sample included a small number ( $N = 35$ ) of work teams within a single organization. However, our post hoc checks revealed that teams and their members did not appear to have been self-selected in our study. Yet it remains that we were not able to determine whether our final sample of teams and their members was representative of the population of teams and individuals within the target organization. Therefore, the generalizability of our results needs to be addressed through replication in other

organizations and larger samples. Also, as our data were collected within a single organization—a French company operating in the aerospace industry—specific features of the organization such as its culture, technology, and strategic orientation may limit the generalizability of findings. It would be interesting to examine whether the observed relationships could be moderated by country-level differences (cf. Kirkman et al., 2009). For example, low power-distance cultures may facilitate leaders' building on followers' competencies and creative potential to guide individual performance.

Third, there were 14 teams for which within-unit agreement on leadership was below standards, suggesting that, leadership climate does not form within certain work groups. It would be worth investigating why this phenomenon occurs. As Chan (1998) suggested, it is possible that some lower-level variable leads to subgroupings of individuals within teams. For example, individual skills, knowledge, and abilities may have been heterogeneous at the team level yet more homogeneous at some subgroup level. Although we were not able to identify such sources of within-team diversity in the company where the study was conducted, this issue may be of importance for future research. Indeed, diversity may facilitate the exchange of ideas and learning processes (Kearney & Gebert, 2009), hence potentially increases the impact of transformational leadership on adaptability.

Fourth, our study used home-made measures of adaptive performance and climate for innovation. Although the psychometrics of these measures was reasonably good (i.e., dimensionality and internal consistency) and the measure of adaptive performance was cross-validated, future effort at validating our measures is warranted. Fifth, future research should examine whether transformational leadership actually facilitates followers' access to their implicit self-esteem, or whether the use of implicit self-esteem enhances the relationship between transformational leadership and adaptive performance, as was theorized in this study. Similarly, future research should address other potential intermediary processes such as core self-evaluations (Bono & Judge, 2003) and psychological empowerment (Chen et al., 2007) through which transformational leadership could impact followers' adaptive performance. Similarly, other boundary conditions such as team interdependence should be explored (Chen et al., 2007; Rosen et al., IN PRESS). Clearly, much work remains to be done to achieve a better understanding of the role of transformational leadership in adaptive performance.

## Appendix

### Scale Items

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#### *Adaptive Performance<sup>a</sup>*

Handling emergencies and unpredictable situations

1. I keep focused on the situation to react quickly.
2. I quickly take effective action to solve the problem.
3. I examine available options and their implications to choose the best solution.
4. I easily change plans to deal with the new situation.

Handling work stress

5. I stay calm under circumstances where I have to take many decisions at the same time.
6. I seek solutions by talking to more experienced colleagues.
7. My colleagues often ask me for advice in difficult circumstances because I keep cool.

Solving problems creatively

8. I try to develop new methods for solving atypical problems.
9. I rely on a wide variety of information to find an innovative solution to the problem.
10. I try to avoid following established ways of addressing problems to find an innovative solution.
11. My colleagues take advice from me for generating new ideas and solutions.

Learning

12. I search for innovations in my job so as to improve work methods.
13. I take actions (within or outside the company) to keep my skills up to date.
14. I anticipate changes in my job by participating in projects or assignments that help me deal with change.
15. I am always looking for opportunities (e.g., training, interactions with colleagues, etc.) that help me increase my job performance.

### Demonstrating interpersonal adaptability

16. I change my way of working as a function of others' feedback and suggestions.
17. I always develop positive relationships with the people I interact with when doing my job because it helps me perform better.
18. I learn new ways of doing my job to better cooperate with colleagues.
19. I try to consider others' viewpoints to better interact with them.

**Climate for Innovation<sup>b</sup>**. Please indicate the extent to which the following norms and practices are in use in your team:

1. Scanning and examining the external environment to anticipate changes and prevent risks.
2. Building scenarios of the future to deal more effectively with expected changes.
3. Identifying the best opportunities in your environment.
4. Creating and innovating on a continuous basis to compete with other companies.
5. Developing a culture of change within the team.
6. Searching for opportunities for development.

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a. Note that the final selection of items for adaptive performance pertained to five facets of the construct (see details on the scale-development procedure in the Method section). Respondents (i.e., team members;  $N = 120$ ) were asked to report how they usually behave in the different areas of adaptive performance described in the items.

b. Respondents to climate for innovation items were team managers ( $N = 35$ ).

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## Bios

**Audrey Charbonnier-Voirin** is an assistant professor of human resource management at INSEEC Bordeaux Business School. Her current research interests include people management and work performance, the role of line managers and organizational agility.

**Assâad El Akremi** is an associate professor of human resource management at Université de Toulouse 1 Capitole (France), where he is also a researcher in the Center of Research in Management. In addition to organizational justice, his current research interests include social exchange, socialization, workplace deviance, corporate social responsibility, and research methods.

**Christian Vandenberghe** is a professor of organizational behaviour at HEC Montréal. Since 2005, he has been the holder of the *Canada Research Chair in management of employee commitment and performance*. His research interests include organizational commitment, turnover and performance, organizational change, and employee well-being.