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Exploitation and Exploration Climates' Influence on Performance and Creativity: Diminishing Returns as Function of Self-Efficacy

Giles Hirst
Australian National University
Daan van Knippenberg
Erasmus University
Qin Zhou
University of York
Cherrie Jiuhua Zhu
Monash University
Philip Cheng-Fei Tsai
Wenzao Ursuline University of Languages

In response to calls for multilevel research examining individual and meso-level processes to understand how exploitation and exploration dynamics play out in teams, we propose that individual in-role performance (cf. exploitation) and creativity (cf. exploration) are associated with team exploitation and exploration climate respectively, and this influence is moderated by domain specific performance and creative self-efficacy respectively. Studying 317 engineers in 70 teams across three national regions, we theorize and find domain-specific evidence that when individual self-efficacy is high, team climate has diminishing performance (exploitation climate × performance self-efficacy) and creative (exploration climate × creative self-efficacy) benefits. By simultaneously studying creativity and performance, our study helps understand the differences and communalities in the drivers of those outcomes in identifying both the domain-specific character of these influences and the similarity in how these influences play out.

Keywords: *creativity; performance; multilevel; team climate; self-efficacy*

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Corresponding author: Giles Hirst, Research School of Management, Australian National University, Canberra, Australia.

E-mail: giles.hirst@anu.edu.au

Employees need to demonstrate both high levels of performance and creativity for their firm to succeed and prosper (Gong, Zhou, & Chang, 2013; Miron, Erez, & Naveh, 2004). Yet we possess limited knowledge of the common and distinctive antecedents of employee performance and creativity (Gong et al., 2013; Gong, Huang, & Farh, 2009). Studying both outcomes simultaneously enables integrative theory building and also speaks to the challenge of simultaneously encouraging employee in-role performance and employee creativity through exploration or exploitation (March, 1991). In addressing this issue, we emphasize cross-level team influences, because teams are ubiquitous to organizations and individual performance and creativity are embedded in, and influenced by, the team context (e.g., Hirst, van Knippenberg, & Zhou, 2009).

In considering team-level influences, a key element in our analysis is recognizing that the differing priorities of creativity and in-role performance have strong parallels in the differing priorities emphasized for exploration (a focus on learning and innovation) and exploitation (a focus on efficient performance on more routinized tasks; Lavie, Stettner, & Tushman, 2010; March, 1991). Just as employees strive for individual performance and creativity, the teams in which they work may place varying emphasis on exploration or exploitation goals as a means to achieve these outcomes (e.g., Beckman, 2006). We propose that such team orientations toward exploitation and exploration can be understood as aspects of team climate (cf. Anderson & West, 1998; Jansen, van den Bosch, & Volberda, 2006) that influence individuals by conveying the appreciation for, and importance of, efficient in-role performance and exploratory creative activities respectively.

We also add an important qualification here, however, through an integration of this team climate perspective with insights from social cognitive theory's study of self-efficacy (Bandura, 2001). Self-efficacy is a particularly relevant influence here because it not only affects individual performance and creativity (Gong et al., 2009), but also provides a frame of reference through which individuals interpret the context in which they are embedded (Richter, Hirst, van Knippenberg, & Baer, 2012). Key to our analysis in this respect is the notion that individuals with higher self-efficacy need less encouragement from the situation to pursue achievement goals (cf. Hirst et al., 2009). More specifically we propose that team climate more easily encourages the performance and creativity of individuals with higher self-efficacy, but also has diminishing returns in that an encouraging climate adds little to the performance or creativity of individuals with high self-efficacy beyond a certain point (cf. the notion that there are limits on the pay-off on self-efficacy; Lim & Choi, 2009; Vancouver & Kendall, 2006; Yeo & Neal, 2006). Thus, we show that team climate and individual self-efficacy influences should be seen not as additive but rather as interacting to shape individual's achievement strivings.

Moreover, by simultaneously studying creativity and performance, our study helps understand the domain-specific influences on these outcomes and parallels in how they can best be achieved. It speaks to repeated calls for multilevel research examining individual and meso-level processes to understand how exploitation and exploration dynamics play out in teams (e.g., Birkinshaw & Gupta, 2013; Junni, Sarala, Taras, & Tarba, 2013; Lavie et al., 2010). In addition, we extend self-cognitive theory by developing an understanding of the interplay of self-efficacy beliefs with the social context, highlighting that the context may have fewer performance and creative benefits for efficacious employees. Whereas such contextual influences are consistent with social cognitive theory (Bandura, 2001),

they are so far essentially unexplored in the study of self-efficacy's influence on creativity and performance.

Literature Review and Hypotheses

Employees' in-role performance refers to how well the individual performs the actions specified and required by an employee's job description (Janssen & van Yperen, 2004). These mandated job performance requirements serve to make work behavior predictable so that essential organizational tasks can be completed to achieve unit and organizational goals (Campbell, McCloy, Oppler, & Sager, 1993; Motowidlo & Van Scotter, 1994). Although differing job functions place varying emphasis on creativity, creativity does not necessarily lead to successful job performance, nor does job performance equate to demonstrating creativity (Unsworth, 2001). Creativity, unlike the performance of prescribed procedures, processes, or targets, inherently involves dealing with uncertainty and unpredictability. Creativity at work involves the individual developing practical and new solutions to workplace challenges to provide tangible and useful outcomes for the organization (Amabile, 1996; Ford, 1996; Oldham & Cummings, 1996; Shalley, 1991). Creative responses may also take the form of enhancements or innovations to procedures or "blue-sky" approaches to develop new and useful procedures, processes, or products. Thus in-role performance (or for short: performance) in most job functions relates to core activities in an individual's work behavior that are more likely to be predictable, routinized, and open to standardization. Creativity in comparison includes the development of new and useful approaches to resolve workplace problems and challenges and thus inherently holds elements of unpredictability and uncertainty that preclude routinization or standardization.

Whereas individual creativity and performance are largely studied in isolation from each other, research in exploration and exploitation has considered similar issues at a higher level of analysis (i.e., the team or organization; Lavie et al., 2010). Ever since March's (1991) seminal research, studies have sought to understand the tension between a focus on maximizing efficiency and productivity (i.e., exploitation) and a focus on learning, creativity, and innovation (i.e., exploration). Teams may have substantial discretion in the extent to which they emphasize exploitation or exploration (Rosing, Frese, & Bausch, 2011). As such, they may convey both a message as to the desirability and appropriateness of a focus and an emphasis on efficient performance or exploration to stimulate creativity, and thus stimulate these outcomes at the individual level.

The literature on exploitation and exploration describes performing one's work efficiently by exploiting available resources as compared with exploring new activities as a basis for creative endeavors culminating in innovations (Gibson & Birkinshaw, 2004). Exploitation involves refinement, efficiency, and improvement that reduce variance and increase reliability and control, whereas exploration refers to search, variation, and experimentation that foster innovative processes (Beckman, Haunschild, & Phillips, 2004; Benner & Tushman, 2003; Gupta, Smith, & Shalley, 2006). Building on this work, we propose that a team's focus on exploitation or exploration can thus be understood as part of the team climate (Jansen et al., 2006)—a proposition that is mirrored in research on team orientations toward learning and performance (Alexander & van Knippenberg, 2014; Bunderson & Sutcliffe, 2003; DeShon, Kozlowski, Schmidt, Milner, & Wiechmann, 2004).

Accordingly, we define team exploitation climate as the extent to which shared perceptions of the team's goals and activities emphasize efficiency, reliability, and timeliness, and prioritize the structured, ordered, and methodical completion of task work (Beckman et al., 2004; Benner & Tushman, 2003; Lubatkin, Simsek, Ling, & Veiga, 2006; Patel, Messersmith, & Lepak, 2013). Teams that have a strong exploitation climate emphasize efficient implementation, production, and refining cost-effective practices. In comparison, we define team exploration climate as the shared perception of the extent to which the team encourages broad search and discovery through trying new techniques, experimenting, and considering new or differing ways of solving applied problems (Lubatkin et al., 2006; Patel et al., 2013). Teams with a strong exploration climate view activities that involve experimentation, trying new approaches, and discovering new methods (Katila & Ahuja, 2002; Rosenkopf & Nerkar, 2001) as of great importance, and prioritize creativity, risk taking, and innovation.

Whereas team climates may exert multilevel influences on individual performance and creativity, prior research illustrates that different individuals respond differently to common contextual influences (for a review, see van Knippenberg & Hirst, in press). Social cognitive theory articulates that self-efficacy not just is important for performance and creativity but may also moderate responses to contextual influences (Bandura, 2001). This, we propose, is exactly the role self-efficacy has in influencing the way individuals interpret and respond to team exploitation climate and team exploration climate. We propose that self-efficacy shapes individuals' responses to these influences and thus forms an individual-level contingency of team climate's cross-level influence. We argue that the mechanisms underlying this interactive influence are similar for creativity and performance, yet uniquely tied to their domain-specific climate and domain-specific self-efficacy.

Self-efficacy is a capacity judgment that is conceptually narrower in that it reflects beliefs more specifically tied to a particular domain of goal pursuit (Bandura, 1997). As a consequence, self-efficacy specific to a given activity domain is most relevant in predicting and understanding achievement in that domain (Bandura, 1986; Tierney & Farmer, 2002). We argue this also applies to the distinction between performance and creativity. Creative self-efficacy, the self-view that one has the ability to produce creative outcomes (Tierney & Farmer, 2002), will be positively related to creativity. Conversely, performance self-efficacy, defined as an employee's belief of being capable of using existing approaches, resources, and techniques to solve work challenges and get the job done, should be positively related to an employee's job performance (i.e., performance self-efficacy captures what the term self-efficacy is often implied to denote, but to clarify the distinction with creative self-efficacy, we label this performance self-efficacy).

Team exploitation and exploration climates may encourage the pursuit of performance or creative goals respectively, but this is not to say that each individual team member will be affected equally by these influences. Social cognitive theory (Bandura, 2001) proposes that self-efficacy informs individuals' responses to domain-relevant contextual factors. We propose that self-efficacy in a domain makes it easier for an individual to act on the encouragement and facilitation provided by team climate in that domain. Accordingly, the moderating influence of self-efficacy in the relationship between team climate and achievement will also be domain-specific.

A further consideration is that the self-efficacy literature suggests that this moderating role comes with an additional complication at higher levels of self-efficacy. The issue here is that

whereas self-efficacy in a domain may stimulate both goal pursuit and persistence, high levels of self-efficacy in some circumstances may invite overpersistent pursuits of unrealistic or risky goals, reducing the capacity to further attain a desired goal. In such settings where both self-efficacy and contextual encouragement are high, individuals are less hesitant to respond to social cues (i.e., team climate), suggesting that goal-directed activities in the domain are appreciated, expected, and supported, because they will have more confidence in their ability to engage in such activities successfully. As a result, the individual may deploy extensive resources and efforts toward particular strategies to achieve above the norm (Michel, 2011). Effort in itself is unlikely to diminish performance, but adopting a particular strategy or pattern of behaviors as consequence of this effort will have fewer additional returns once the benefits of such an approach have been realized. Thus, strong team climate encouragement has less benefits for individual achievement for individuals with high levels of self-efficacy.

In the current study, we bring this more general proposition to bear on self-efficacy's moderating role facilitating the influence of team climate. We propose that when team climate is particularly conducive to pursuing a goal in a particular domain, high self-efficacy attenuates the benefits of the high degree of contextual encouragement and support. The net result then is that the team climate has diminishing returns for individuals with high self-efficacy: As climate gets stronger, its positive influence diminishes, resulting in a curvilinear relationship. In contrast, lower levels of self-efficacy render individuals less certain of their own capacity and thus more responsive to increasing contextual encouragement from team climate. For these individuals increasing contextual encouragement translates to greater achievement of these outcomes.

This analysis also implies that the relationship between team climate and achievement is more positive for individuals with high rather than low self-efficacy at more modest levels of team climate (i.e., low to moderate). With more modest team climate encouragement, higher self-efficacy will translate into a more focused effort in line with the contextual encouragement without resulting in overcommitment or overutilization of particular strategies associated with high team climates. In sum, we propose a curvilinear relationship between team climate and achievement for individuals with high self-efficacy that is complemented by a linear relationship between climate and achievement for individuals with low self-efficacy (i.e., for which more favorable climates offer encouragement and support without overinvestment in particular approaches). As will be evident from our emphasis on the domain-specific nature of team climate and self-efficacy, we propose that these influences are uniquely tied to the combination of team exploitation climate, performance self-efficacy, and performance, and to the combination of team exploration climate, creative self-efficacy, and creativity. Having explained the overarching logic of our predictions, we develop specific hypotheses drawing on our overarching conceptual analysis in the following sections.

Team Exploitation Climate, Performance Self-Efficacy, and Performance

Our analysis suggests that to understand the interplay of team climate and individual self-efficacy in shaping individual performance, we have to consider the influences specific to the performance domain: team exploitation climate and performance self-efficacy. Moreover, we should consider performance self-efficacy as a factor that may render individuals more

receptive to the influence of team exploitation climate up to a point, but that at higher levels this will be associated with diminishing returns of team climate.

Team exploitation climate encourages and facilitates performance and performance self-efficacy informs responses to such contextual stimulation. Performance self-efficacy is the sense of one's ability to perform tasks efficiently and reliably. This self-belief reduces the threshold by which individuals act and sustain energy to engage in problem-solving activities and seek greater efficiency in task performance to deliver reliable performance outcomes. Put differently, individuals with higher performance self-efficacy require more modest encouragement from the team exploitation climate to invest in efficient and focused in-role performance than individuals lower in performance self-efficacy. Accordingly, at more modest levels of team exploitation climate, the relationship between climate and individual performance is stronger for individuals with higher performance self-efficacy.

Importantly, however, following the further development of our analysis as outlined previously, this enhanced stimulation only holds up to a point. At higher levels of performance self-efficacy, self-efficacy itself is such a strong internal driver of performance that situational influences like team climate yield diminishing returns beyond a moderate level of encouragement and support. Thus the relationship between team exploitation climate and individual performance is stronger for individuals with high performance self-efficacy than for individuals with lower performance self-efficacy in the range from weak to moderate team climate. Yet, stronger team climates do not linearly add to the performance of individuals with high performance self-efficacy, but rather show a weaker influence. In effect, this implies a curvilinear relationship for individuals with higher self-efficacy. In contrast, for individuals with lower performance self-efficacy, team exploitation climate may encourage activities focused on efficient in-role performance and because this self-efficacy does not provide a strong internal drive, this influence is linear from weak to moderate to strong climates (even when it is not as strong as it can be for individuals high in performance self-efficacy at the more moderate parts of this range).

Hypothesis 1: Team exploitation climate has a linear positive relationship with performance for individuals with lower performance self-efficacy, and a curvilinear relationship with performance for individuals with higher performance self-efficacy, such that this positive relationship has diminishing returns for higher levels of team exploitation climate.

Team Exploration Climate, Creative Self-Efficacy, and Creativity

Again drawing on our overarching theoretical framework that predicts domain-specific interactive influences of team climate and individual self-efficacy, we propose that for individual creativity the interplay of team exploration climate and creative self-efficacy assumes center stage. For individuals with high creative self-efficacy the encouraging and facilitating influence of team exploration climate will have a positive relationship with creativity, and more so than for individuals with low creative self-efficacy, up to moderate climate levels. Individuals with an efficacious view of their creative capabilities will possess even at modest levels of team encouragement the impetus to explore and persist with challenging experimental activities stimulating their creativity. In this context individuals have a sense of their ability to develop creative solutions to problems and some encouragement by the context stimulating them to engage in exploratory activities that seed creativity.

Following from our overarching conceptual analysis, however, at higher levels team exploration climate will have diminishing creative returns for individuals with high levels of creative self-efficacy. The reason for this is that high creative self-efficacy is an internal driver of creativity that benefits less from contextual encouragement beyond moderate levels. The result is a curvilinear relationship of team exploration climate with individual creativity for individuals with high creative self-efficacy: More moderate levels of climate provide clear encouragement for creativity for individuals high in creative self-efficacy, but there is diminishing creative value added of this contextual encouragement beyond modest levels.

Individuals with lower creative self-efficacy in comparison will be less encouraged to engage in creative activities than individuals higher in creative self-efficacy at more moderate levels of team exploration climate, but this stimulating influence of team climate is not subject to diminishing returns. That is, because their self-efficacy provides less of an internal drive, they are more susceptible to high levels of contextual encouragement than individuals with higher creative self-efficacy.

Hypothesis 2: Team exploration climate has a linear positive relationship with creativity for individuals with lower creative self-efficacy, and a curvilinear relationship with creativity for individuals with higher creative self-efficacy, such that this positive relationship has diminishing returns for higher levels of team exploration climate.

Method

Research Setting, Participants, and Procedure

These data were collected in an international program of research including Australia, Taiwan, and Mainland China to understand how to simultaneously encourage employee performance and creativity. These regions had experienced significant economic growth over the past decade, reporting considerable innovation investment, while experiencing challenges sustaining productivity (Australia: Organisation for Economic Co-operation and Development, 2011; Taiwan and China: International Monetary Fund, 2010). We studied engineers because their work involves both the development of creative solutions to problems and also necessitated the efficient, timely delivery of work according to pragmatic constraints. Participating organizations were in both the public and private sector across a broad range of industries including construction, industrial design, manufacturing, IT, and electronics. The teams were responsible for large projects such as construction, road building and design, developing new or refined manufacturing and electronics production processes as well as implementing new software processes including the development, modification, or upgrade of software. In all of these activities engineers needed to develop new and useful solutions to practical problems necessitating creativity. Unlike other work disciplines such as R&D, design, or artistic endeavors, there was a stronger emphasis on the timely and cost-effective delivery of solutions. Thus creativity and performance were of comparable importance requiring creative workable solutions delivered according to particular time and cost parameters.

The sample consisted of 70 teams comprising 317 engineers. In all, 33%, 31%, and 36% of teams were from Australia, Taiwan, and China respectively, with an average 72% response

rate. On average teams comprised 6 people, with the Chinese teams being slightly larger than the sample norms comprising 9 (M = 8.64) people. Of the sample, 75%, 18%, and 7% were classified as engineering staff, supervisors, and senior managers/executives respectively. In total, 65% of the sample was male. Individuals on average worked in their current department and their organization for 3.5 and 5 years respectively. The bulk of the sample had tertiary qualifications. Regarding education, 66% had undergraduate qualifications, 25% also held a postgraduate degree, 2% had completed a PhD, and one respondent held an MBA. The remainder had high school qualifications or had completed a degree at a technical college (these colleges commonly teach trade skills like computer-aided design or draftsperson drawing). Of the sample, 60%, 28%, and 9% were 20 to 29, 30 to 39, and 40 to 49 years of age respectively. The remaining 4% were 50 years or more. Engineering staff completed questionnaires providing demographic details and ratings of independent variables included in the study. These questionnaires also contained an individualized code that provided anonymity but allowed the university researchers to match data. Program leaders were e-mailed a separate questionnaire to rate team members' performance and creativity. Questionnaires were developed in English and then translated for Taiwanese engineers according to the procedures described by Brislin (1980). Minor modifications were made to the Taiwanese questionnaire to ensure the characters were consistent with the language used by engineers in Mainland China resulting in certain phrases being reworded.

Measures

Seven-point Likert-type scales were used (1 = *very strongly disagree* to 7 = *very strongly agree*).

Performance self-efficacy was adapted and developed from the constructs and items used by Kruglanski, Webster, and Klem (1993) and March (1991). The four items were as follows: "I am good at using existing approaches to solve problems," "I have a knack for using existing knowledge to improve work practices and processes," "I feel I am good at working to deadlines," and "I have a knack of making use of available resources and existing techniques."

Creative self-efficacy was measured by the three-item measure developed by Tierney and Farmer (2002). A sample item is "I feel I am good at generating novel ideas."

Team exploitation climate comprised four items adapted and developed from prior ambidexterity research (Lubatkin et al., 2006; Patel et al., 2013). These items asked team members to rate the extent to which the team viewed the following activities as important: "invests considerable energy to develop consistent and efficient methods and procedures," "prefers to refine tried and tested methods," "leverages existing methods and established approaches," and "lowering costs is an important objective."

Team exploration climate comprised four items where team members rated the extent to which the team viewed the following activities as important: "experiments with new approaches and methods," "places importance in learning from each other," "explores new ways of doing things (e.g., new construction methods, engineering approaches or analytical techniques)," and "sees experimentation and the use of exploratory techniques as very important."

Employee performance was slightly adapted from Janssen and van Yperen's (2004) in-role job performance scale. Thus the items used were as follows: "always completes the duties specified in his/her job description," "meets all the formal performance requirements

of the job," "meets all responsibilities required by his/her job," and "never neglects aspects of the job that he/she is obligated to perform."

Creativity was measured using the four-item measure reported by Baer and Oldham (2006). A sample item is "often comes up with creative solutions to problems at work."

Control Variables

Accounting for sample heterogeneity, we controlled for individual age band, country, and organizational tenure. As age had comparable intervals, we entered this as a continuous variable. Dummy country variables were created (i.e., Australia and Taiwan).

Scale Validation and Aggregation Tests

To examine the questionnaire factor structure, we conducted confirmatory factor analysis (CFA) comparing the hypothesized six-factor model to a series of intuitively plausible alternative models: (a) a five-factor Model A combining team exploration and team exploitation climate; (b) a five-factor Model B combining creative self-efficacy and performance self-efficacy; (c) a five-factor Model C combining creativity and performance; (d) a two-factor Model A combining creativity and performance and combining creative self-efficacy, performance self-efficacy, team exploration climate, and team exploitation climate; (e) a two-factor Model B combining creativity, creative self-efficacy, and team exploration climate, and combining performance, performance self-efficacy, and team exploitation climate; (f) a one-factor model. Results of the CFA indicate that our hypothesized six-factor model had a good fit with the data, $\chi^2 = 408.45$, $df = 215$, $p < .001$, Tucker–Lewis index = .95, comparative fit index = .95, root mean square error of approximation = .05, standardized root mean square residual = .05. Furthermore, nested model comparisons showed that the hypothesized six-factor model had a significantly better fit than the five-factor Model A, $\Delta\chi^2 = 57.32$, $\Delta df = 5$, the five-factor Model B, $\Delta\chi^2 = 208.36$, $\Delta df = 5$, the five-factor Model C, $\Delta\chi^2 = 605.15$, $\Delta df = 5$, the two-factor Model A, $\Delta\chi^2 = 1241.70$, $\Delta df = 14$, the two-factor Model B, $\Delta\chi^2 = 1899.46$, $\Delta df = 14$, and for the one-factor model, $\Delta\chi^2 = 2364.58$, $\Delta df = 15$, indicating the distinctiveness of the study variables. Using the methods described by Fornell and Larcker (1981), we tested the construct and discriminant validities calculating the composite reliability and the average variance extracted (AVE). The results showed that the composite reliability for all variables exceeded the .70 cutoff value indicating a satisfactory level of construct validity. Furthermore, the AVE for all variables except for exploitation (with an AVE value of .428) exceeded the .50 cutoff value indicating adequate discriminant validity. Within the exploitation scale all items, except one, "lowering costs is an important objective," which loaded as .345, displayed adequate loadings (.676 to .775). Analyses conducted without this item replicated the study results. Thus the lower loading item did not alter study conclusions.

We examined whether the data justified aggregation of team-level constructs by calculating rwg(j) (James, Demaree, & Wolf, 1984) and ICCs (Bliese, 2000). Following LeBreton and Senter (2008) and Meyer, Mumford, Burrus, Campion, and James (2014), we calculated rwg(j)s using the uniform null distribution (high-end estimate) and slightly skewed distribution (low-end estimate) to account for potential rating biases present in our data. The resultant median rwg(j) values for exploration and exploitation were .89-.92 and .87-.90 respectively. In all, 90% of groups for exploration and 77% of groups for exploitation

Table 1
Means, Standard Deviations, and Intercorrelations Among Study Variables: Individual-Level Analyses Below the Diagonal, Group-Level Analyses Above

	M (*SD*)	1	2	3	4	5	6	7	8	9	10
1. Organizational tenure	5.25 (5.66)		.71**	.28**	–.06	.17	.23	.13	.08	.24*	.21
2. Age[a]	2.46 (.95)	.68**		.42**	–.02	.18	.32**	.14	–.04	.04	.10
3. Taiwan[a]	.23 (.42)	.36**	.41**		–.47**	–.21	–.18	–.12	–.34**	–.18	–11
4. Australian[a]	.12 (.33)	.07	.10	–.21**		.18	.08	–.29*	–.07	.04	.15
5. Performance self-efficacy	5.48 (.92)	.07	.11	–.13*	.00	**(.84)**	.57**	.38**	.32**	.16	.16
6. Creative self-efficacy	5.12 (.96)	.05	.12*	–.10	.04	.52**	**(.80)**	.37**	.38**	.05	.07
7. Team exploitation	5.24 (.87)	.03	.08	–.16**	–.16**	.41**	.38**	**(.69)**	.55**	.20	.08
8. Team exploration	5.44 (.92)	–.03	–.03	–.27**	–.05	.37**	.34**	.63**	**(.83)**	.07	.17
9. Performance	5.45 (.92)	.00	–.09	–.22**	–.08	.20**	.03	.15**	.13*	**(.92)**	64**
10. Creativity	4.75 (1.14)	–.01	–.02	–.17**	–.01	.27**	.24**	.17**	.18**	.56**	**(.91)**

Note: Employees $N = 317$, teams $N = 70$. Scale reliabilities are in parentheses and bold.
[a]These variables are categorical variables.
*$p < .05$, two-tailed.
**$p < .01$, two-tailed.

achieved strong agreement in team members ratings (rwg > .70) (LeBreton & Senter, 2008). According to one-way analysis of variance exploitation and exploration climate differed between teams ($p < .05$). The ICC(1) and (2) based on this procedure were (.08, .28) for team exploitation and (.09, .32) for team exploration, indicating employees' ratings of their respective team climates were accounted for by their team membership (Bliese, 2000). However, the values for ICC(2) were lower than ideal for both constructs. Taken together, the rwg(j) and ICCs statistics provide sufficient basis to support aggregation of constructs to the team level (Bliese, 2000; Kozlowski & Hattrup, 1992).

Results

Table 1 displays correlations among variables. Individual-level variables are below and aggregated variables above the diagonal. Given the nested nature of the data we used hierarchical linear modeling (HLM) to test our cross-level interaction hypotheses by estimating a series of random coefficient models (RCMs). To assess the suitability of the data to run RCM analysis we checked whether variance resided between groups (Liao & Rupp, 2005). For employee performance the analyses revealed that 45% of the variance in performance resided

Table 2
Cross-Level Analyses for Employee Performance and Creativity

	Performance			Creativity		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Organizational tenure	.00 (.02)	.00 (.02)	.00 (.02)	–.01 (.02)	–.01 (.02)	–.01 (.02)
Age	.00 (10)	.00 (.10)	–.01 (.10)	–.06 (09)	.06 (.09)	.07 (.09)
Taiwan	–.38 (.21)	–.32 (.27)	–.32 (.27)	–.12 (.24)	.11 (.26)	.11 (.26)
Australia	–.13 (22)	.07 (.28)	.07 (.28)	.21 (.23)	.47 (.26)	.47 (.26)
Individual-level variables						
Performance self-efficacy	.15 (.05)*	.15 (.05)**	.22 (.06)**	.14 (.09)	.14 (.09)	.25 (.11)*
Creative self-efficacy	–.12 (.05)*	–.12 (.05)*	–.14 (.06)*	.12 (.08)	.12 (.08)	.16 (.11)
Team variables						
Team exploitation climate		.24 (.10)*	.24 (.10)*		.18 (.11)	.18 (.11)
Team exploitation climate^2		–.02 (.06)	–.02 (.06)		–.00 (.07)	–.00 (.07)
Team exploration climate		–.11 (.15)	–.12 (.15)		.09 (.17)	.09 (.17)
Team exploration climate^2		–.09 (.10)	–.09 (.10)		–.15 (.11)	–.15 (.11)
Cross-level interactions						
Team exploitation climate × Performance self-efficacy			–.04 (.06)			–.08 (.09)
Team exploitation climate^2 × Performance self-efficacy			–.08 (.04)*			–.10 (.05)
Team exploration climate × Creative self-efficacy			.04 (.06)			.09 (.07)
Team exploration climate^2 × Creative self-efficacy			.00 (.04)			–.14 (.06)*
Deviance	772.17	778.84	789.66	929.26	932.92	932.06
Pseudo-R^2	.06	.07	.09	.11	.13	.16

Note: Employees $N = 317$, teams $N = 70$. Standard errors are in parentheses.
*$p < .05$.
**$p < .01$.

between teams (to be explained by Level 2 variables), $\tau_{00} = .41$, $p < .001$, ICC(1) = .45. For employee creativity the analyses revealed that 30% of the variance in creativity resided between teams (to be explained by Level 2 variables), $\tau_{00} = .37$, $p < .001$, ICC(1) = .30. These results warrant the use of RCM in our analysis. The ICC(1) for creative self-efficacy and performance self-efficacy was .017, $F(69, 247) = 1.322$, $p > .05$, and .061, $F(69, 247) = 1.431$, $p < .05$, respectively. Thus, although both constructs are theoretically individual-level variables group membership exerted a certain degree of influence on both self-efficacy constructs. We group mean centered Level 1 variables except for dummy variables for nation, which were uncentered in testing the cross-level interaction, to partial out potential group-level interactions (Enders & Tofighi, 2007).

Table 2 summarizes the results for the outcome variables of performance (Models 1, 2, and 3) and creativity (Models 4, 5, and 6) respectively. To test the hypotheses we first

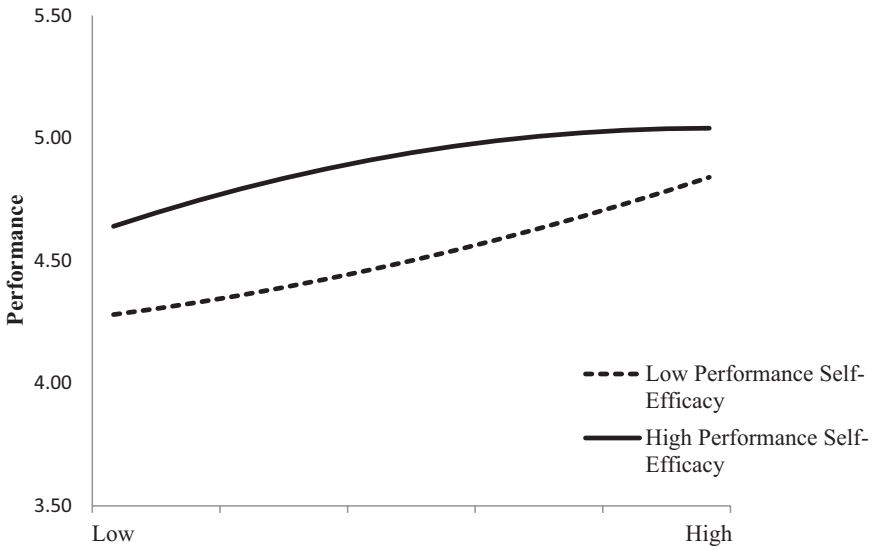
entered the control variables and the Level 1 variables including both measures of self-efficacy (Models 1 and 4). In the second step we entered team-level variables including the linear and quadratic terms (Models 2 and 5). In the following step we entered the linear and quadratic cross-level interactions of the relevant team orientation (Models 3 and 6).

Hypothesis 1 predicted that team exploitation climate has a linear positive relationship with performance for individuals with lower performance self-efficacy, and a curvilinear relationship with performance for individuals with higher performance self-efficacy such that this positive relationship has diminishing returns for higher levels of team exploitation climate. Thus the relationship between team exploitation climate and performance varies as a function of the values of performance self-efficacy and team exploitation climate. As shown in Table 2 (Model 3), the coefficient for the interaction between the quadratic term of team exploitation climate and performance self-efficacy was significant ($\gamma = -.08$, $SE = .04$, $p = .03$) indicating that performance self-efficacy moderated the curvilinear relationship between team exploitation climate and performance, providing preliminary support for Hypothesis 1. To better understand the nature of relationships with performance we conducted two types of tests of the slopes. In the first we compared the linear and quadratic terms of team exploitation climate on performance under low and high performance self-efficacy. This enabled us to test for the significance of the linear and quadratic relationships under these conditions. In the second set of analyses we examined the slopes of individual performance on team exploitation climate at low, medium, and high values of team exploitation climate in combination with low and high performance self-efficacy to determine the range of values of team exploitation climate for which the relationships were positive, negative, or not different from zero. This enabled us to examine the slopes of these relationships at these particular points. These results are described following.

We first used the model reported in Table 2 (Model 3) as basis to construct equations reflecting the relationship between team exploitation climate and performance for high and low performance self-efficacy. Following Aiken and West (1991), we first standardized both performance self-efficacy and team exploitation climate and then substituted the values for high performance self-efficacy (+1 *SD*) and low performance self-efficacy (–1 *SD*) respectively. We then reran the HLM equation when performance self-efficacy was low and high respectively. The coefficients for the overall linear trend in the relationship between team exploitation climate on performance was positive but nonsignificant ($\gamma = .12$, $SE = .10$, $p = .28$) for high performance self-efficacy and significantly positive ($\gamma = .25$, $SE = .10$, $p = .02$) for low performance self-efficacy. In contrast, the quadratic coefficient that reflects the curvilinearity of the relationship between team exploitation climate and performance was negative approaching significance ($\gamma = -.10$, $SE = .06$, $p = .07$) for high performance self-efficacy but positive and nonsignificant ($\gamma = .02$, $SE = .08$, $p = .76$) for low performance self-efficacy. As illustrated in Figure 1, a general linear positive relationship was observed between team exploitation climate and performance for low performance self-efficacy whereas a slightly inverted U pattern for performance on team exploitation climate was observed for high performance self-efficacy.

To examine the gradient of the simple slopes under different team exploitation climate conditions for low and high performance self-efficacy following Aiken and West's (1991) procedures, we defined team exploitation climate at high (+1 *SD*), medium (the mean), and low (–1 *SD*) levels reporting the corresponding slopes. For individuals low on performance

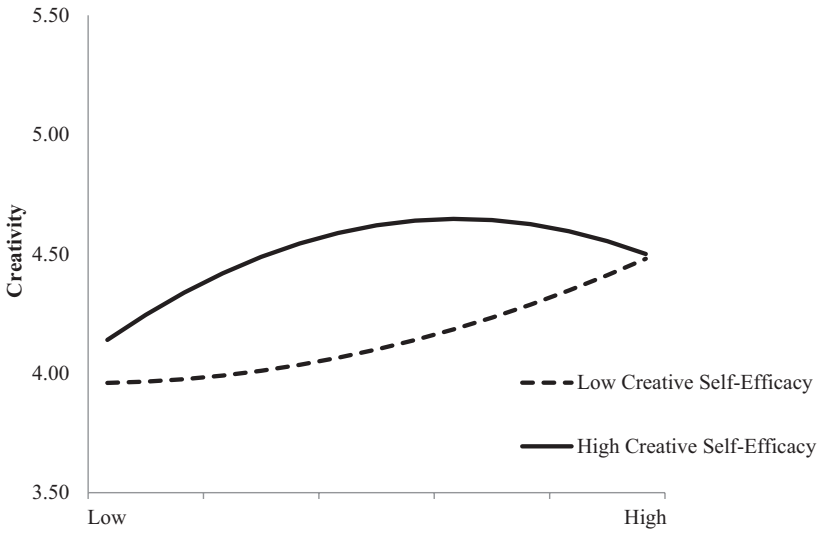
Figure 1
Interaction Between Performance Self-Efficacy and Team Exploitation Climate to Predict Employee Performance



self-efficacy, the simple slope was positive under the three conditions of team exploitation climate, that is, when team exploitation climate was low ($\gamma = .20$, $SE = .18$, $p = .28$), medium ($\gamma = .25$, $SE = .10$, $p = .02$), and high ($\gamma = .29$, $SE = .19$, $p = .13$). For individuals high on performance self-efficacy, the simple slope of the regression curve was positive and significant when team exploitation climate was low ($\gamma = .31$, $SE = .17$, $p = .04$), positive and nonsignificant at the medium ($\gamma = .12$, $SE = .10$, $p = .28$), but became negative and nonsignificant when team exploitation was high ($\gamma = -.10$, $SE = .23$, $p = .67$). These results support the appearance of the relationship of performance on team exploitation climate having a general positive linear trend for low performance self-efficacy and tapering a diminishing gradient as team exploitation climate increases for high performance self-efficacy. Taken together these results provide support for Hypothesis 1.

Hypothesis 2 predicted that team exploration climate has a linear positive relationship with creativity for individuals with lower creative efficacy, and a curvilinear relationship with creativity for individuals with higher creative efficacy such that this positive relationship has diminishing returns for higher levels of team exploration climate. Thus the relationship between team exploration climate and creativity depends on the values of creative efficacy and team exploration climate. As shown in Table 2 (Model 6), the coefficient for the interaction term between the quadratic term of team exploration climate and creative self-efficacy was significant ($\gamma = -.14$, $SE = .06$, $p = .02$), indicating that creative self-efficacy moderates the curvilinear relationship between team exploration climate and creativity, providing preliminary support for Hypothesis 2. Like the procedures described for the prior interaction, we first standardized creative self-efficacy and team exploration climate and then

Figure 2
Interaction Between Creative Self-Efficacy and Team Exploration Climate to Predict Employee Creativity



used the model reported in Table 2 (Model 6) as basis to construct two equations to examine the relationship between team exploration climate and creativity for high and low creative self-efficacy. The coefficients for the overall linear trend in the relationship between team exploration climate and creativity was positive nonsignificant ($\gamma = .18$, $SE = .12$, $p = .18$) for high creative self-efficacy but positive and significant ($\gamma = .28$, $SE = .12$, $p = .02$) for low creative self-efficacy. In contrast, the quadratic coefficient that reflects the nature of the curvilinear relationship between team exploration climate and creativity was negative and significant ($\gamma = –.28$, $SE = .09$, $p < .001$) for high creative self-efficacy but nonsignificant ($\gamma = .11$, $SE = .10$, $p = .28$) for low creative self-efficacy. As shown in Figure 2, we observed an overall positive linear pattern for the relationship between team exploration climate and creativity for individuals with low levels of creative self-efficacy but an inverted U curve pattern for individuals with high creative self-efficacy. As with the previous hypothesis, we further probed the simple slopes of creativity on team exploration climate at different levels of team exploration climate and creative self-efficacy. We first defined high (+1 *SD* above the mean), medium (the mean), and low (–1 *SD* below the mean) levels of team exploration climate and tested the corresponding simple slopes. The results showed that for employees low on creative self-efficacy, the slopes were in general positive under the three conditions of team exploration, that is when team exploration was low ($\gamma = .07$. $SE = .22$, $p = .74$), medium ($\gamma = .28$, $SE = .12$, $p = .02$), and high ($\gamma = .49$, $SE = .23$, $p = .04$). For employees high on creative self-efficacy, the slope was positive when team exploration climate was low ($\gamma = .74$. $SE = .21$, $p < .001$), positive nonsignificant when team exploration was medium ($\gamma = .18$, $SE = .12$, $p = .18$), and became negative nonsignificant when team exploration was high ($\gamma = –.38$, $SE = .24$, $p = .12$). These results support the appearance of the relationship of individual

creativity on team exploration climate having a general positive linear trend for individuals low on creative self-efficacy and tapering a diminishing gradient as team exploration climate increases for those high on creative self-efficacy. Taken together these results provide support for Hypothesis 2.

As an additional check of our results we examined whether the hypothesized interactions could be observed with different interaction combinations. For example we examined the quadratic interaction between exploitation climate and creative self-efficacy on employee performance or the quadratic interaction between exploration climate and performance self-efficacy on employee creativity. These interactions that were not hypothesized were not significant. These results provide inferred support for the two hypotheses illustrating that the interactions are specific to the particular outcome, above and beyond other possible nonhypothesized relationships.

Discussion

Employee creativity and efficient in-role performance are core to organization success yet different domain-specific antecedents are required to achieve these outcomes. To provide a more complete understanding of individual efficacy in teams we examined how the interaction of individual self-concept with the context influences individual performance and creativity respectively. Drawing on social cognitive theory we theorized and found that getting the best performance and creative results is not about more of "everything." When individuals are low on self-efficacy, team climates encouraging exploitation and exploration respectively deliver increasing performance and creative benefits. The situation is more complex for efficacious individuals. Up to moderate levels increasing team encouragement of exploitation and exploration is associated with clear performance and creative returns. When team encouragement for exploitation and exploration increases beyond this point, the returns on such encouragement diminish and individuals with high levels of self-efficacy show less additional performance and creative returns.

Theoretical Implications

The main contribution of the current study lies in its identification of the curvilinear cross-level interactions of domain-specific team climate and self-efficacy. Uncovering these interactive influences, complex as they may be, contributes to the advancement of theory in individual creativity and performance in a number of ways.

Individual employees' striving for achievement is subject to team climate influences that shape what is seen as appropriate and desirable. Our results demonstrate that team-level and individual-level influences that by themselves are positive antecedents of performance and creativity in combination yield diminishing returns. This puts a premium on considering cross-level team climate influences on creativity and performance. Consideration of either individual or team characteristics in isolation does not do justice to the complexities of achievement striving at work. Indeed, such a consideration would not be fully justified in the sense that it implies an additive model in which team-level influences and individual-level influences are independent, whereas the present study shows that the one influence is contingent on the other. Viewed through this lens, the current findings add support for the emerging focus on individual achievement striving as

codetermined by individual characteristics and the team context (e.g., DeShon et al., 2004; Hirst et al., 2009). As the first cross-level study examining domain-specific exploitative and exploratory influences on individual performance and creativity we highlight the benefits of examining a broader range of contextual influences. Future research would be particularly valuable studying different team interventions such as how quotas drive exploitation or whether rewarding practices such as creative experimentation encourages exploration. Research may also compare the role of leadership behaviors such as initiating structure to drive exploitation and intellectual stimulation to foster exploration climates.

The present findings are important in demonstrating that creativity and performance are subject to similar influences—the interplay of team climates and individuals' beliefs in their own capabilities—but that these influences should be understood in domain-specific terms. Individual creativity is affected by the interaction of team exploration climate and creative self-efficacy, not of team exploitation climate and performance self-efficacy. Conversely, individual performance is influenced by the interaction of team exploitation climate and performance self-efficacy rather than of their counterparts in the creativity domain. These findings underscore that at a more fundamental level there are important communalities in the factors governing creativity and performance, but at the same time they also highlight the domain-specificity of these influences. These results speak to research examining how to align multiple performance outcomes (Gong et al., 2009; Gong et al., 2013). Such analyses are particularly important as they shed new light on how different organizational influences can even lead to competition between outcomes (Ozer, 2011). Our study adds that although we found performance and creativity to be positively related to each other, the antecedents for each differed; yet the mechanisms to achieve these outcomes were remarkably similar.

Third, the diminishing returns of the drive provided by the combination of a supportive climate and self-efficacy demonstrate "more is not necessarily better" where team climates and self-efficacy are concerned. This is no minor point as the basic proposition in the team climate and self-efficacy literatures still seems to be one of a uniformly positive influence of supportive climates and self-efficacy respectively (Bandura & Locke, 2003; van Knippenberg, Homan, & van Ginkel, 2012), even when there is growing awareness that such conclusions need to be qualified (Bunderson & Sutcliffe, 2003; Eisenbeis, van Knippenberg, & Boerner, 2008; Schmidt & DeShon, 2010; Vancouver, More, & Yoder, 2008). The more justified conclusion is that both supportive team climates and individual self-efficacy may provide important encouragement for the pursuit of creativity and performance, but that for such encouragement there can be a "saturation point"—the encouragement cannot and should not be assumed to always translate to increasingly successful pursuit of the achievement itself. Our analyses of these relationships illustrate that beyond such a saturation point the consequences of such a strategy are not significantly negative but rather deliver negligible additional returns beyond this point. Such curvilinear effects appeared particularly clear for creativity, and although we are cautious to draw too much from our analysis of slopes, appear only slightly attenuated for performance. This tentatively suggests that the diminishing effects might be weaker in the case of more routine outcomes. Further research is required to examine the precise relationships evidenced by these curves under these specific conditions.

The current analysis extends social cognitive theory (i.e., the conceptual home of the self-efficacy concept; Bandura, 1986). Whereas contextual moderation has been hinted at by Bandura (2001), the present study is in fact the first to our knowledge to investigate it empirically and to more fully develop a conceptual analysis to guide this investigation. From that perspective, then, the present study breaks new ground for social cognitive theory and the study of self-efficacy by not only providing empirical evidence regarding moderating influences of the social context, but also advancing theory of social-contextual moderation.

In a related vein, creative self-efficacy actually was negatively related to performance when performance self-efficacy was included in the model. This finding is consistent with the notion from research in exploration and exploitation that what motivates exploration may discourage exploitation, because resources invested in the one may go at the expense of resources invested in the other (e.g., Gupta et al., 2006). Our analysis was not developed to address this issue, and we do not observe evidence for such a trade-off across the board (i.e., similar negative relationships for performance self-efficacy or team climate influences were not observed). We therefore do not believe it is appropriate to draw strong conclusions about this unhypothesized finding here. We do note, however, that a finding like this does speak to the importance of the simultaneous study of creativity and performance as it illustrates the factors conducive to the one may be disruptive to the other.

Implications for Practice

Investing in building team climate and self-efficacy to enhance performance or foster creativity has greater pay off if these investments are domain-specific. There is no general "one-size-fits-all" supportive team climate or self-efficacy construct that is as effective in delivering efficient in-role performance or fostering creativity. Efforts to build team climate or self-efficacy thus should specifically target the precursors to the desired outcome. This means targeting team exploitation climate and performance self-efficacy to promote efficient performance or team exploration climate and creative self-efficacy in pursuit of creativity.

As individual self-efficacy displays strong main effects with domain relevant performance and creative outcomes management interventions should build individual self-concept through coaching, supportively challenging individuals' hidden negative assumptions and thinking traps, and providing a safe environment enabling employees to take on increasingly demanding challenges without fear of failure. For managers who have successfully enhanced employee self-efficacy the message is more complex. To a moderate degree it is important to encourage team exploitation and exploration climates by emphasizing the respective benefits of efficiency, for example by benchmarking expenditure decisions, tracking cost and time invested in program delivery as opposed to encouraging information searching, exploration, and experimentation strategies, for example by conducting industry analyses of good practice, building industry–university connections, or exploring technologies adopted by different industries. This means once a leader of efficacious employees has developed team climates that encourage exploitation or exploration there are respectively fewer performance and creative benefits from continuing along this strategy. Such a finding differs from generally expected management practice and illustrates that climates that are high on exploitation have the most consistent positive relationship with performance for employees who are low on self-efficacy. Such contextual encouragement stimulates individuals low on performance

self-efficacy to display greater performance than they would display based on their own self-concept alone.

Limitations and Directions for Future Research

Due to its cross-sectional design, the current research does not allow for conclusions about causality. Even when experimental research in group dynamics and self-efficacy gives us some confidence that the assumptions about causality implied by our analysis would not be unreasonable here (cf. Bandura & Locke, 2003; Cialdini, Bator, & Guadagno, 1999), future research would ideally include field experimental designs that allow for such conclusions about causality. As an aside, we may note that such research would also be useful to evaluate the effectiveness of interventions to be applied in practice.

Although our study examined the relationships between individual performance and creativity we did not examine the question of how such individual achievements translated to a greater team output. The question of how performance at lower levels influences larger strategic organizational outcomes is an important and under-researched topic and not least one where strong assumptions are often made that individual performance and creativity will inevitably translate into team and organizational benefits (Gong et al., 2013). It is one we highlight needs far greater research for understanding both how individuals' contributions enhance team performance as well as why some individual contributions are ignored, overlooked, or fail to translate to collective outcomes. A further consideration is that our study examined interactions between measures of climate and self-efficacy relevant to exploitation and exploration, whereas it is more common for ambidexterity researchers (e.g., He & Wong, 2004) to examine how these forces interact with each other. Rather than examining this tension, we strove to understand common influences on performance and creativity. The exploitation and exploration interaction poses interesting directions for cross-level research in teams. For example one might wonder how teams manage conflict associated with implementing potentially competing goals or scarce resources. Likewise although ambidextrous practices predict a range of performance outcomes, psychological theory raises questions about whether such tensions may even result in goal conflict, or goal diffusion and consequent work overload (Locke, Smith, Erez, Chah, & Schaffer, 1994). Research reconciling these possible simultaneous positive and negative effects of ambidexterity would be of great value.

Our team climate measures derived from prior research (Lubatkin et al., 2006; Patel et al., 2013) and theory (i.e., Beckman et al., 2004; Benner & Tushman, 2003) distinguishing exploitation from innovation to provide conceptual clarity and distinctiveness from creativity. Although this framing of exploitation follows well-established practice it certainly is not the only definition within the literature. Indeed the search for conceptual agreement on the dimensions of ambidexterity is one of the challenges to the cumulative progression of this literature (Birkinshaw & Gupta, 2013). Such an issue is a particular vexed one given that different industry sectors place varying emphasis on different priorities (e.g., lowering costs as opposed to meeting necessary reporting standards). The consequence is that questionnaire items tapping into these issues will have varying utility in these different contexts and these issues need to be considered carefully by future researchers in their selection of measures. We also acknowledge the lower than desired ICCs scores for the team climate measures which may have been due to the relatively small group sizes (LeBreton & Senter,

2008) or to the fact that teams worked across different sites and experienced membership changes reasonably frequently. In effect lower ICCs mean greater within group variance equating to a weaker contextual set of influences, which if anything is likely to attenuate group influences.

Another consideration is the generalizability of an engineering sample. Arguably, engineering teams provide a context uniquely focused on delivering both efficient and creative outcomes, and a legitimate question is whether contextual influences therefore are relatively unique compared to other organizational settings. On the other hand, one might argue that through attraction-selection-attrition processes (Schneider, 1987), engineers are likely to have a preference for both efficient performance and creative activities. Consistent with this view, the variance in our respondents' self-efficacy beliefs was relatively low (i.e., reflecting the self-selection of employees), which as a consequence may result in understating of the relationships. Thus, there is merit in research replicating our study in heterogeneous work settings. Nonetheless we also note the results were based on data collected from different organizations across three regions, increasing our confidence in the generalizability of the results. Moreover, by testing our framework using a multicompany, multinational/regional sample, we provide evidence that an Anglo-European-derived theory is also useful for understanding behavior across different cultural settings (Drazin & Schoonhoven, 1996; Farmer, Tierney, & Kung-McIntyre, 2003).

Conclusion

While largely overlooked by the literature, managers often face the dual demands of seeking high levels of performance and creativity—the challenge of balancing the drive for both exploitation and exploration. When leading individuals embedded in a team context this requires an understanding of how individual characteristics interact with the team's climate. Our study speaks to these issues and suggests that domain-specific influences are required to foster both individual in-role performance and creativity—with the important caveat that beyond a point these cross-level influences yield diminishing returns.

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