

A multilevel investigation of factors influencing creativity in NPD teams

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Received 15 September 2006; received in revised form 4 May 2007; accepted 2 October 2007
Available online 26 November 2007

Abstract

Understanding creativity in the context of a new product development (NPD) team is of paramount importance, especially in the high-technology industry where creativity is a key resource. Building on the mood-as-input model, this study examines how contextual factors (organizational support and organizational control) moderate the relationship between team affective tone and team creativity. The data collected comprise 343 sets of responses involving 106 NPD teams drawn from high-technology firms. The results of this study show that negative affective tone relates positively to team creativity when organizational support is high and organizational control is low, but the linkage between positive affective tone and team creativity as moderated by context factors is found to be insignificant. This article likewise includes research limitations, future research directions, and theoretical and managerial implications.

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Keywords: Team affective tone; Team creativity; New product development team; Hierarchical linear modeling

1. Introduction

Tom Kelley (2001), general manager of leading design firm IDEO, said that “Discovering how to effectively create a ‘hot team’ and make it innovative is the only key to success for a company.” Moreover, Christensen (1997) in *The Innovator’s Dilemma* argues that establishing a good team directly influences the success of new products, especially in the high-technology industry. This is because new product development (NPD) success in highly competitive markets is largely dependent on teams’ generation of creative market ideas in response to rapidly changing market needs (Amabile, 1988). In prior research, there were numerous scholars who found many different factors that influence creativity in NPD teams (Im & Workman, 2004; Scott & Bruce, 1994). Correspondingly, a review of the literature suggests two potential questions for understanding these key factors.

First, scholars claim that organizations become increasingly dependent on teams when developing new products and other innovations (Bharadwaj & Menon, 2000). Despite this, past studies still present the relationship of individual-level factors

(e.g., Andrews & Smith, 1996), team-level factors (e.g., Sethi, Smith, & Park, 2001), or contextual-level factors (e.g., Im & Workman, 2004) with creativity or innovativeness. However, most of these studies discussed and examined such relationships using a higher-level measure for each unit at the lower level and then conducting analyses strictly at the lower level, or aggregating measures taken at the lower level of analysis and then conducting analyses at the higher level only (e.g., Leenders, van Engelen, & Kratzer, 2003). This practice could lead to atomistic fallacies especially if the findings were used to make inferences about team-level or higher-level relationships (Kozlowski & Klein, 2000).

Second, the identification of the cognitive and affective processes involved in the creative process is a crucial theoretical issue in the creativity of NPD teams’ research. Nevertheless, Russ (1993) argues that there has been too much focus on cognitive processes in creativity research. Many researchers and theoreticians believe that the effect of affective factors on creativity is a subject that needs further exploration (Csikszentmihalyi, 1990). Although the relationship between affective factors and creativity is a widely studied topic in the field of psychology and organizational behavior (e.g., Shalley, Zhou, & Oldham, 2004; Zhou & George, 2001), studies on such a relationship in NPD teams in the marketing literature are scarce despite the paramount importance of the issue.

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Against these backdrops, a cross-level model should be employed into which team- and contextual-level factors are integrated; likewise, it is necessary to explore the importance of the relationship between contextual factors (organizational support and organizational control) and NPD team affective tone and team creativity. This study adopts Martin and Stoner's (1996) mood-as-input model, which is particularly relevant for understanding the relationship between negative and positive affect and the creativity model (e.g., Martin, Abend, Sedikides, & Green, 1997; Martin & Stoner, 1996). This model states that people use their current affect as an informational cue and reflect its context-dependent nature in their behavior. On the basis of the mood-as-input model, this study contributes to the literature by identifying the contextual-level factors which affect the relationship between team affective tone and team creativity in an NPD team.

This study has three objectives. First, this study explores relevant literature by focusing on key variables and then deriving the hypotheses from these. Second, it uses a cross-level model to examine how contextual-level factors moderate the relationship between team affective tone and team creativity within the NPD team context. Finally, it discusses the research limitations, future research directions, and theoretical and managerial implications of the study in light of the findings.

2. Theoretical background and hypotheses

In Martin and Stoner's (1996) mood-as-input model, there is an important premise that moods provide people with information. The significance and consequences of this information depend on the organizational context in which the mood was formed. Essentially, the context provides people with cues concerning their ongoing behaviors, and the organizational context in which tasks are performed serves to define the overall objective by which people evaluate the adequacy of their efforts to date or their progress on a task (Martin & Stoner, 1996). This view provides the basic framework of this study, which means that investigating behavior (e.g., creativity) and performance should not only consider feelings (affect state) but also the context in which people experience these feelings (e.g., organizational support/ control). This allows us to focus on a relatively team affective tone as well as the contextual moderators in a context conducive for the empirical testing of our hypotheses.

2.1. Why are team affective tone and context important for team creativity?

Creativity is a complex concept that researchers define in a variety of ways (Shalley, Gilson, & Blum, 2000). According to different research approaches, creativity can be roughly given four definitions (i.e., personality, environment, product, and process). Although the terms used by scholars are different, they refer to similar concepts (e.g., Glisan & Hawes, 1990; Higgins, 1999). The current study views creativity from the process approach consistent with Amabile's (1988) study that team creativity involves the production, conceptualization, or

development of novel and useful ideas, processes, or procedures by an individual or by a team of individuals working together.

In exploring teams' creativity in the study of NPD, prior studies focused on the effects of different cognitive factors (e.g., Leenders et al., 2003), while the effects of affective factors were not adequately given attention. However, the concept of the affective state in marketing literature now calls for a broader integrative view in the workplace (Bagozzi, Gopinath, & Nyer, 1999). Previous studies suggest that the affective state consists of two separate dimensions: positive and negative. Majority of these previous studies suggest that when team members experience positive affect, their cognitive or motivational processes are enhanced, and their creative thinking and problem-solving skills are facilitated (Hirt, Levine, McDonald, & Melton, 1997). In relation to this, Isen's research consistently demonstrates that positive affect results in greater creativity and cognitive flexibility (e.g., Estrada, Isen, & Young, 1994; Isen & Daubman, 1984). However, a few studies suggest that negative affect also plays an important role in creativity (George & Zhou, 2002), although they do not seem to be related in a direct, simple, and consistent fashion (Amabile, 1996a,b; James, Clark, & Cropanzano, 1999). Obviously, no agreement has been reached from previous studies regarding the relationship between affect and creativity. In relation to this, Zhou and George (2001) theorize that under certain conditions, negative affect might be positively related to employee creativity, and they argue that negative affect is context dependent and does not automatically lead to creativity. In other words, context has a conclusive effect on the relationship between affective state and creativity.

Through the studies on contextual-level factors that affect creativity, the core constructs are no more than the support and inhibition of creativity in the organization (Amabile, 1996a,b). The development of the minivan is a case which can illustrate the importance of this point.

After the failure of the Edsel, the unwritten rule at Ford Motor Company was 'not to break the mold'. Although Ford product designers were the first to conceive of the contemporary (and very popular) minivan, the idea never went past the drawing board stage because they still gunshy with former embarrassing failure. However, when the same designers from Ford moved to Chrysler and received superordinate encouragement to pursue the idea in the face of great uncertainty, the minivan they developed turned out to be one of the most innovative and successful new products in the recent history of the automobile industry. (Sethi et al., 2001, p.78)

Context is where other teams, departments and organizations live (Hackman, 1999), and it is very important for a company to develop a context which is geared toward helping its employees. Therefore, CEOs or NPD team leaders who want their NPD teams to strive for innovative outcomes should pay attention to the organizational context as related to their NPD teams. This study considers two organizational context factors. The first is organizational support. Research indicates that employees need organizational systems and procedures to support and encourage their creative efforts (Shalley et al., 2000). Cummings and

Oldham (1997) ever take supervisory style to indicate an organizational supporting type. They point out when supervisors are supportive, they show concern for their employees' feelings and needs, encourage them to voice their own concerns, provide positive and informational feedback, and facilitate their employees' skills development. These actions promote employees' feelings of self-determination and personal initiative at work, allowing them to consider, develop, and ultimately contribute more creative outcomes. Andrews and Farris (1967) state that scientists' creativity was higher when their organizations were supportive and when managers listened to their employees' concerns and asked for their input regarding decisions affecting them. Similarly, studies show that an open interaction with supervisors, encouragement, and support enhance creativity and innovation (e.g., Kimberly & Evanisko, 1981). Therefore, a supportive organization environment should boost and foster team creativity. On the other hand, organizational control, the other contextual factor, which consists of rigid operating procedures, surveillance of employees, and a strong emphasis on following rules (Shalley et al., 2000), or the excessive use of rigid rules, checks, and controls, may inhibit creativity (Kopnowski, 1972). Cummings and Oldham (1997) also suggest that when the controlling degree of supervisory behavior is higher, it will shift an employee's attention away from his or her own ideas and focus it more toward external concerns.

2.2. How do contextual factors moderate the affect-creativity linkage?

Employee behavior is a function of both the person and the place (Terborg, 1981). Thus it must first notice the context of where an employee lives if we want to know the employee's behavior. Cummings and Oldham (1997) point out that employees worked in a variety of different contexts — some contexts allowed employees to use their high creative potentials, while others do not. They also argue that employing people with lots of creative potential will only have an impact on creative outcomes if the context is set up to nurture and encourage these creative potentials. It can be understood that different contexts may produce different effects on creativity. This is the reason why there have been no uniformly good predictors of the factors which affect creativity.

This study is based on the mood-as-input model (Martin & Stoner, 1996) that examines the nature of these constructs' relation, depends on the extent to which the work context signals the importance of creativity through organizational support and organizational control, a metamood process. Furthermore, George and Zhou (2002) argue that people are most likely to use their mood as input to determine how well they are doing and how much effort to exert when the context provides cues or signals that there is an overall objective to be achieved.

The foregoing discussion suggests that when NPD team members are in negative affect, and every member feels that he/she is not working hard enough, the support provided by the manager, bonus increases, adjustments in working flexibility

(e.g., working time or working procedure) lower organizational control, lesser punishments against minor mistakes, or revision of rigid rules may motivate all members to work harder, which will in turn will more easily result in team creativity. On the other hand, when NPD team members are in positive affect, and every member feels that he/she is working normally, such measures like those mentioned above will not be able to produce the same significant effect since the members do not think that their normal work results from the reforms in organizational processes or the increase in rewards. In this case, they are more confident than ever and are inclined to believe that working harder is unnecessary. As a result, team creativity is not easily generated. Meanwhile, if organizational control is lowered, then the team will take the present working results for granted and, correspondingly, their will for cultivating creativity may decline. Hence, this study proposes organizational support and organizational control as important contextual-level factors which moderate the relationship between team affective tone and team creativity in NPD teams. Thus, this study comes up with the following hypotheses:

Hypothesis 1. Organizational support and control moderate the relation between negative affective tone and team creativity in an NPD team such that when organizational support is higher and organizational control is lower, negative affective tone relates positively with team creativity.

Hypothesis 2. Organizational support and control moderate the relation between positive affective tone and team creativity in an NPD team such that when organizational support is higher and organizational control is lower, positive affective tone relates negatively with team creativity.

3. Method

3.1. Participants and procedures

The sample for this study was randomly drawn from a listing of high-technology firms from the Taiwan Stock Exchange (TSE). The survey was pre-tested on 20 individuals who were involved in NPD activities in NPD teams. They were specifically asked to comment on the clarity of the items and their relevance. Consequently, the wordings of some statements were modified. In the data collection process, the current study follows Huber and Power's (1985) guidelines on how to obtain high-quality data from key informants. Using the key informant design is a common practice in studies on marketing (Moorman & Rust, 1999). NPD team leaders or Research and Development (R&D) department managers were selected as the key informants because they are knowledgeable about the overall NPD team's status.

Two hundred sets of questionnaire were sent to NPD team leaders and R&D department managers along with a personal letter that provided a brief introduction and a general explanation of the study's objectives. A single envelope contained 12 copies of the questionnaire which were allotted for the team members (10 copies), the team leader (1 copy), and

the CEO (1 copy). A large, postage-paid return envelope was also provided together with this. The informants were requested to set up a central collection box where the team members, team supervisors, and the CEO could drop off their sealed envelopes, or as an alternative, they could also mail the questionnaires directly to us. One month after the initial mailing, a follow-up mail was sent containing the same materials in order to increase the study's response rate (Dillman, 1978).

The current study collected data from three sources: the NPD team members, their supervisors, and the CEO/or Vice President (VP). The members filled out a questionnaire that included items soliciting demographic data and measuring the team-level independent variables (team affective tone and team creativity) which were used in the present study. On a separate form, each NPD team supervisor also rated team creativity to test whether or not the self-reported creativity of the team members was consistent with the supervisors' answers, as well as to increase the cross-validity (Chen, Farn, & MacMillan, 1993). A final and separate questionnaire form was distributed to each CEO or VP that included items measuring the contextual independent variables (organizational support and organizational control). A total of 343 responses were collected which represents a 17.2% response rate. All in all, there were 106 NPD teams, which mainly included 28 teams from the computer and peripheral industry (26.4%), 19 teams from the semi-conductors industry (17.9%), and 12 teams from the audio and video electronic products industry (11.3%). The average age of the respondents was 40.66 years (ranging from 26 to 63 years), the average NPD team size was 5.71 (ranging from 3 to 9 persons), and the average team tenure was 8.64 years (ranging from 3 to 15 years).

Since non-response bias is always a concern in survey research, the *t*-test was employed on the major constructs to confirm if there were significant differences between early and late respondents (Armstrong & Overton, 1977). With the collected samples, no significant differences were found between early and late respondents on all measures in this study.

3.2. Measures

The measures for all constructs were tested for their validity and reliability. First, the internal consistency was examined, and

in Table 1 represents the reliability coefficients and descriptive statistics for all constructs. All major constructs show reliabilities ranging from .82 to .92, which are higher than Nunnally's (1978) criterion. Additionally, the aggregation of responses was justified by testing inter-rater agreement (r_{wg} ; James, Demaree, & Wolf, 1984) and using intraclass correlation coefficients (ICCs) to test whether or not between-group variance was sufficient to warrant team-level modeling (Bliese, 2000).

This study includes examining convergent validity as Bagozzi and Yi (1988) and Bagozzi, Yi, and Phillips (1991) recommend by using a confirmatory measurement model. The results suggest that all indicators are significantly and positively loaded on the subjective latent constructs, which indicates that all measures have good convergent validity with all indicators. Moreover, Chi-square tests were also conducted to confirm discriminant validity. The significant results of the tests were in favor of the unrestricted models over the restricted ones, and this meant that all constructs had sufficient discriminant validity (Anderson & Gerbing, 1988).

3.2.1. Positive and negative affective tone

Positive and negative affective tone was measured using Watson, Clark, and Tellegen's (1988) Positive and Negative Affective Scale (PANAS). The PANAS contained 10 items that are indicative of positive affect, and 10 items that are indicative of negative affect on a five-point scale ranging from 1 (very slightly or not at all) to 5 (extremely). The responses were averaged in each of the sets of items for an overall score of positive affective tone (Cronbach's $\alpha = .92$) and negative affective tone (Cronbach's $\alpha = .83$), respectively. However, a precedent in the literature exists for assessing positive and negative affective states with scales like the PANAS, which provides instructions on how to ask respondents to report on how they felt at work during the past week (e.g., Brief, Burke, George, Robinson, & Webster, 1988). A one-week time frame was chosen to ensure that the current study was measuring affective states and not traits. James et al. (1984) argue that when a team has aggregation phenomenon the r_{wg} value should be above 0.8. After which, it was found that NPD team members had high agreements on their rating of positive affect (median $r_{wg} = .92$). Following the James et al. (1984), their responses were averaged in this study. The NPD teams also exhibited

Table 1
Descriptive statistics and correlations^a

Variable	Means	SD	1	2	3	4	5	6	7
1. Team size	5.71	2.33							
2. Team tenure	8.64	5.12	.06						
3. Positive affective tone	4.58	0.37	.19	.17	(.92)				
4. Negative affective tone	2.19	1.45	.28	.23	-.36*	(.83)			
5. Team creativity	4.11	0.38	.27	.26	.34*	-.31*	(.91)		
6. Organizational support	3.87	0.64	.17	.18	.37*	.33*	.39**	(.82)	
7. Organizational control	2.01	1.09	.15	.19	-.37*	-.36*	-.42**	-.57***	(.87)

* $p < .05$.

** $p < .01$.

*** $p < .001$.

^a $n = 106$ (NPD teams). Values in parentheses are reliability coefficients.

sufficient between-group variance for testing our hypotheses: the value for ICC (1), representing the ratio of between-group to total variance, was .33; the value for ICC (2), representing the reliability of average team perceptions, was .78. On the other hand, NPD team members also demonstrated a high agreement on their rating of negative affect (median $r_{wg} = .90$). Moreover, NPD teams also exhibited sufficient between-team variance for testing our hypotheses (ICC (1) = .25; ICC (2) = .82).

3.2.2. Team creativity

Since the task of an NPD team is complicated and multifaceted, what kind of standardized system could be used to score the team's creativity is unclear (Leenders et al., 2003). In order to correctly measure team creativity, therefore, the present study adopted and revised the scales from Scott and Bruce (1994) and Zhou and George (2001). These scales were originally used for engineers, scientists, and technicians employed in a large, centralized R&D department of an industrial corporation. This study correspondingly revised all items for suitability to the study's context at team level on a five-point scale ranging from 1 (not at all characteristic) to 5 (very characteristic). For all 106 NPD team samples, the ratings were collected, and the scores per team were averaged which showed high agreements on their rating of team creativity (median $r_{wg} = .94$). Thus, their responses were averaged, and all NPD team samples also exhibited sufficient between-team variances for testing our hypotheses (ICC (1) = .26; ICC (2) = .78). Moreover, the overall measure had a high aggregate reliability (Cronbach's $\alpha = .91$).

The measure for team creativity was thus derived from the assessment of its own members. The instrument is a quasi self-reported measure. Self-reported measures are often criticized mainly through the argument that some people are unable to report on themselves accurately due to reasons of poor introspection (Locke, Latham, & Erez, 1988). Consequently, a paired-samples *t*-test was conducted to check the difference between the two samples (team members' average score versus a team supervisor's score), and it showed no statistically significant difference between the two ratings ($t = 0.76, p < 0.33$).

Furthermore, in order to determine whether or not large differences between supervisor and team member ratings occurred, the absolute deviations between the scores of NPD team members and team supervisors were calculated (Locke et al., 1988). The absolute deviations varied between 0 and 0.87, with a mean of 0.14. In total, the ratings by the team members themselves did not greatly differ from those by the team supervisors.

3.2.3. Organizational support and control

Organizational support was measured using a scale adapted from Niethoff and Moorman (1993), and this scale assessed employees in an organization in terms of voice, participation, and justice. Nine items were revised from the original scale and were ranked on a five-point scale from 1 (not agreeable) to 5 (extremely agreeable). Meanwhile, organizational control was measured using a scale adapted from Hage and Aiken's formalization scale (Shalley et al., 2000). Six items were also revised from the original scale and were ranked on a five-point scale from 1 (not agreeable) to 5 (extremely agreeable). This

scale assessed whether or not employees had to follow strict operating procedures, were watched on the job to ensure that they followed rules, and if they were punished for violating the rules. Overall, organizational support and organizational control measures had high aggregate reliability coefficients of .82 and .87, respectively.

3.2.4. Control variables

Among team demographic variables, *team size*, often plays an important role with regard to group dynamics and performance in previous related studies (Brewer & Kramer, 1986). *Team tenure* is the other important demographic variable. It is a significant variable that influences team members' interaction (Pelled, Eisenhardt, & Xin, 1999), specifically contributing greater creativity to problem-solving and product development activities (Ancona & Caldwell, 1992). Therefore, this study uses team size and team tenure as control variables.

3.3. Data analysis

This study adopts hierarchical linear modeling (HLM; Bryk & Raudenbus, 1992) in exploring the topic. Hofmann, Griffin, and Gavin (2000) point out that HLM provides a more statistically appropriate analysis than traditional calculation of interaction effects by OLS regression for three reasons. First, HLM explicitly partitions the variance in the outcome variable and provides information about the magnitude (and significance) of these variance components. Second, separate regression analyses are performed for each group, relating the lower-level predictors (s) to the lower-level outcome. Because this is done, the level 1 intercepts and slopes are allowed to vary between level 2 units. In contrast, OLS regression conducts a single regression analysis, pooling the lower-level units across groups, and subsequently not allowing the intercepts and slopes to vary. Finally, as a result of the partitioning of the variance in the outcome into its within-group and between-group components, HLM yields a more complex error term than its OLS counterpart. Specifically, the lower-level and high-level errors are separately estimated, whereas the OLS regression approach combines them into a single term.

4. Results

4.1. Descriptive statistics and correlations analysis

Table 1 shows the means, standard deviations, and correlations among all the variables. As these relationships were largely consistent with theories and empirical evidence on team creativity, the results provided criterion-related validity evidence for team affective tone, team creativity, organizational support, and organizational control.

4.2. HLM results for team creativity

This article hypothesizes that both team and context variables relate to team creativity. Thus, using HLM, it first estimates a null model in which no predictors are specified for

either level 1 or level 2 functions to test the significant level of the level 2 residual variances of the intercept ($\tau=4.42, p<.001$). The ICC (1) was .14, indicating that 14% of the variance in team creativity resided between organizations, and that 86% of the variance resided within organizations. This provides evidence that disparity exists among organizations, and the sample is worth for a multilevel analysis.

Next, the core of the conceptual model pertains to the cross-level interactions between team- and contextual-level variables. This study tests the cross-level interactions via using the slopes-as-outcomes models. The slopes-as-outcomes model equations are:

$$\begin{aligned} \text{Level-1 : Team Creativity}_{ij} & \\ &= \beta_{0j} + \beta_{1j}(\text{Positive affective tone}) \\ &+ \beta_{2j}(\text{Negative affective tone}) + r_{ij} \end{aligned} \quad (1)$$

$$\text{Level-2 : } \beta_{0j} = \gamma_{00} + \gamma_{01}(\text{Organizational Support}) + \gamma_{02}(\text{Organizational Control}) + U_{0j} \quad (2)$$

$$\beta_{1j} = \gamma_{10} + \gamma_{11}(\text{Organizational Support}) + \gamma_{12}(\text{Organizational Control}) + U_{1j} \quad (3)$$

$$\beta_{2j} = \gamma_{20} + \gamma_{21}(\text{Organizational Support}) + \gamma_{22}(\text{Organizational Control}) + U_{2j} \quad (4)$$

Hypotheses 1 and 2 propose that context variables moderate the relationship between team affective tone and team creativity. The results for this model indicate that both positive and negative team affect had significant random variances ($\tau=.27, p<.01$ and $\tau=.37, p<.001$, respectively). This finding suggests that significant variability occurs in the level 1 team affective tone–team creativity relationship across organizations. Do context factors explain? Organizational support ($\gamma_{21}=.27, se=.32, t=2.43, p<.01$) and organizational control ($\gamma_{22}=-.25, se=.31,$

$t=2.71, p<.01$) significantly predict the negative affective tone–team creativity slopes only (see Table 2). Therefore, the findings support H1 but not H2.

5. Discussion

This research focuses on providing theoretical and practical insights into the moderating effect of organizational support and organizational control on the relationship of NPD team affective tone to NPD team creativity using Martin and Stoner's (1996) mood-as-input model framework. The results show that contextual-level factors have a differential moderating effect on the relationship between NPD team affective tone and team creativity.

First, the results of this study show that *negative affective tone* relates positively to team creativity when organizational support is high and organizational control is low, but the linkage between *positive affective tone* and team creativity as moderated by context factors was found to be insignificant. This result is consistent with previous findings that organizations which provided a supportive environment and context for creativity tend to reap greater benefits from employees who are innately creative (Cummings & Oldham, 1997). This study also extends the model of George and Zhou (2002) because the findings show that negative affect was positively related to *creative performance* when perceived recognition and rewards for creative performance and clarity of feelings were high at individual-level examinations. As Laurie Dunnavant, a founding fellow of the Innovation University at 3M said, “You can't force feed creativity. But you can create an environment that encourages it.” (Bharadwaj & Menon, 2000). True to what she said, the results of this study attest to her claim.

Second and in contrast to the first finding, there was an insignificant moderating effect of contextual-level factors on the relationship between positive affective tone and team creativity. The reason for this is that team members find it easy to be creative when they have positive affect, but they take this for granted and do not attribute their creativity to the influence of contextual factors. On the other hand, NPD team members find it easier to clarify their feelings when they have negative affect than when they have positive affect. Hence, it is difficult to distinguish whether team creativity stems from the team members' positive affect state or the contextual effect.

Third, the present study is a compelling extension of previous approaches in exploring creativity in NPD teams, in which investigation was limited to micro-only or macro-only analysis, and approaches which ignore the influence of other levels were used. The use of HLM facilitated the adoption of a cross-level approach which enables the investigation of predictors' impact at different levels on team creativity, while maintaining the appropriate level of analysis for these predictors. That is, the moderating effect of organizational construct was incorporated in the theoretical model. Overall, this model provides the foundation for straightforward but powerful managerial and theoretical guidelines without the possibly misleading oversimplifications and without compromising the richness of the contextual setting.

Table 2
HLM results of the level 2 analyses for team creativity^a

Fixed effects	Gamma coefficients	Standard error
Positive affective tone	.11	.22
Organizational support, γ_{11}		
Positive affective tone	-.08	.21
Organizational control, γ_{12}		
Negative affective tone	.27**	.32
Organizational support, γ_{21}		
Negative affective tone	-.25**	.31
Organizational control, γ_{22}		

* $p<.05$.

** $p<.01$.

*** $p<.001$.

^a Team members $n=343$, NPD teams $n=106$.

5.1. Implications for theory and practice

Often, researchers neglect the substantial effects of affective state on the judgment or cognition process of team members, and at times, the results will be very misleading. This study thus complements existing cognition-oriented research primarily through a correlation study on NPD teams by using a cross-level frame to test the moderation effects across team- and contextual-levels within NPD contextual variables. Particularly, this analysis contributes to the study of creativity in the marketing field and stresses the significance of contextual variables in marketing.

As for practical implications within NPD teams or R&D departments, the current research findings serve as a guide for majority of managers or supervisors who pay more attention on improving the creativity of their NPD teams or departments instead of focusing on their employees' affective state. Leaders or managers of firms should pay sufficient attention to every team member's affective state regardless of whether the state is positive or negative. This mindfulness proposal is made because the affective state of an individual gives signals to leaders on what to do in order to appropriately adjust or reorganize the firm structure, like increasing organizational support or relaxing organizational control, for instance. This study is not meant to imply that managers or team leaders should seek to foster negative affect among their members and prevent positive affect in order to encourage creativity. Instead, the current study simply suggests that given the fact that some team members in most organizations are bound to have negative affect with their jobs at one time or another, their supervisors can treat such negative affect as an opportunity for encouraging a generation of novel and meaningful ideas, rather than viewing it as a problem or nuisance. This is especially true in the high-technology industry where creativity is the key resource.

In addition, due to the unique characteristics of the high-technology industry, product failures are not rare, but if every company can learn adopting the method of 3M for NPD teams, like "backing for good tries even if it fails" (Peters & Waterman, 1982: 227) or creating a "hot team" as what IDEO did, continuously caring for the team's welfare contributes to an organizational context which is favorable for creativity. Such steps can transform the negative affect of team members into motivation, thereby driving them to work harder, contribute to team creativity, and improve new product performance. In relation to this, who knows if the most successful creation of the minivan could have belonged to Ford rather than to Chrysler?

5.2. Limitations and future research directions

First, this study concerns positive and negative affective states rather than traits, and the feelings of respondents toward their work during the past week were used as the reference for analysis. However, the team creativity measures do not have a corresponding week time frame in this study. In relation to this, George and Zhou (2002) suggest that an ongoing organizational context over a long period of time demonstrates creativity and hence cannot be measured in just one week. Future research

should therefore try to employ a longitudinal analysis in examining how these relationships develop over time.

Second, the samples were selected from high-technology industries, while other industries involved in providing creative ideas in NPD or R&D processes were excluded. Though single-industry studies can provide some degree of control over environmental peculiarities that confront individual organizations and also enhance a study's internal validity (McKee, Varadarajan, & Pride, 1989), this sampling perhaps diluted the findings for a multi-industry study. Therefore, future research on team creativity should also include other industries for analysis, such as the financial service development industry or the manufacturing industry.

Third, most of earlier studies pointed out that positive affect is likely to promote creativity, while negative affect may promote otherwise (e.g., Isen, 1985). The current study extends this argument by demonstrating the importance of contextual factors for NPD teams using the mood-as-input model as premise. However, future research should particularly identify which contextual factors help promote or hamper the generation of creativity when NPD team members have either positive or negative affect. This will assist leaders in effectively guiding NPD teams to produce and discover "multidimensional creativity" (Kim, 2006) and hence improve new product performance.

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