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TRAIT AFFECT AND INDIVIDUAL CREATIVITY: MODERATING ROLES OF AFFECTIVE CLIMATE AND REFLEXIVITY

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We extended the literature on mood and creativity by introducing a multilevel perspective to examine the trait affect of employees. More specifically, we identified group affective climate and group reflexivity as significant moderators of the relationship between trait affect and creativity. Multilevel analyses of data obtained from 306 employees in 50 organizational teams revealed that group affective climate and group reflexivity facilitated the creativity of those employees with positive trait affect. A positive affective climate had significant direct and interactive effects with positive trait affect in relation to predicting individual creativity. Further, group reflexivity significantly moderated the relationship between positive trait affect and creativity. By identifying and examining these contextual moderators, we have highlighted the context-dependent nature of the affect–creativity relationship. Our findings offer new theoretical insights into the critical role of group context in shaping the effect of trait affect on mood and creativity.

Keywords: mood, creativity, trait affect, creativity–affect relationship, group affective climate, group reflexivity.

As a major source of innovation, creativity has become critical to organizations striving to sustain a competitive edge in a fast-changing, knowledge-based economy (Paulus, 2000). Concurrent with the increasing importance of creativity in organizations, various determinant factors have been identified. Among these, one of the most researched is the role of affect in creativity, for which scholars

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have offered various explanations (To, Ashkanasy, Fisher, & Rowe, 2010). The prevailing hypothesis in earlier studies was that positive moods facilitate creativity by enhancing cognitive flexibility (Isen, 2000), modifying information-processing style (Schwarz, 1990), and broadening individuals' thought–action repertoire (Fredrickson & Branigan, 2005). However, the current focus in perspectives on the mood–creativity link is more on the conditions under which moods can promote creativity, rather than on the default effects of moods on creativity (e.g., George & Zhou, 2007).

The mood-as-input perspective (Martin, Ward, Achee, & Wyer, 1993) offers a theoretical foundation for current trends of thinking, according to which scholars favor a more nuanced model, in which both positive and negative moods can lead to creativity. This perspective challenges the dominant idea in the existing literature that affect predisposes individuals toward particular styles of information processing. Instead, it is postulated that mood interacts with context to shape cognitive strategy and subsequent performance (Hirt, Devers, & McCrea, 2008; Martin et al., 1993), which raises the questions of how an individual interprets the meaning of his/her mood state, and what the influences are on these affective interpretations. Our study is grounded in the mood-as-input model, and we aimed to identify the contextual conditions that can lead to different affective influences on creativity. Specifically, we examined group affective climate and group reflexivity as potential boundary conditions that influence the individual-level affect–creativity relationship as these conditions operate as affective and cognitive lenses through which individual group members attach meaning to their work-group environment (Carr, Schmidt, Ford, & DeShon, 2003).

In group settings, affective and cognitive experiences shared among group members may impact on how an individual both interprets the meaning of his/her affect, and capitalizes on the potentially beneficial effects of affect on his/her creativity. First, *group affective climate* refers to the overall affective tone and affective exchanges that characterize a group (Härtel, Gough, & Härtel, 2008). It can be described as an internally consistent level of either positive or negative affect in groups, may elicit a gain or a loss decision frame for group members (Grawitch & Munz, 2005), and can offer them psychological safety (West & Richter, 2008), thus affecting their creative performance. On the other hand, *group reflexivity* refers to the process of collectively reflecting upon the group's goals and ways to achieve these goals (Urbach, Fay, & Goral, 2010; West, 1996). Group reflexivity has been found to improve both information exchange and learning in groups (De Dreu & Beersma, 2010), thus producing a creativity-supportive environment in which individuals may capitalize on their creativity-enhancing potential.

In sum, in this study we aimed to extend existing research on the affect–creativity link by examining the role of trait affect in creativity, and by

incorporating multilevel perspectives (Kozlowski & Klein, 2000). We depart from the perspective taken by prior scholars, who examined state affect or momentary moods, by exploring the complementary strength of trait affect in relation to creativity research because of time frame. Through identifying and empirically examining how group climate shapes the relationship between trait affect and creativity at the individual level, we will broaden the focus of affect research, most of which has been centered around investigation of affect at the individual level. We will also meaningfully extend the literature on creativity, in which the focus has been mostly on mood state at the individual level, and which has typically involved manipulation in a laboratory setting, with the focus being on the effect of immediate, momentary moods on creativity (Davis, 2009).

Multilevel Extension of the Affect–Creativity Relationship

When the inherently multilevel character of this organizational phenomenon (Hitt, Beamish, Jackson, & Mathieu, 2007) and the context dependency suggested by the mood-as-input perspective (Martin et al., 1993) are considered, a comprehensive understanding of the affect–creativity relationship can be achieved by employing a multilevel approach. To this end, we included in the present theoretical framework two group-level factors that are relevant to affect and creativity: group affective climate and group reflexivity. Both factors represent *group climate*, which is defined as an overall interaction pattern among members and the atmosphere that typifies interactions within a group (Choi, Price, & Vinokur, 2003).

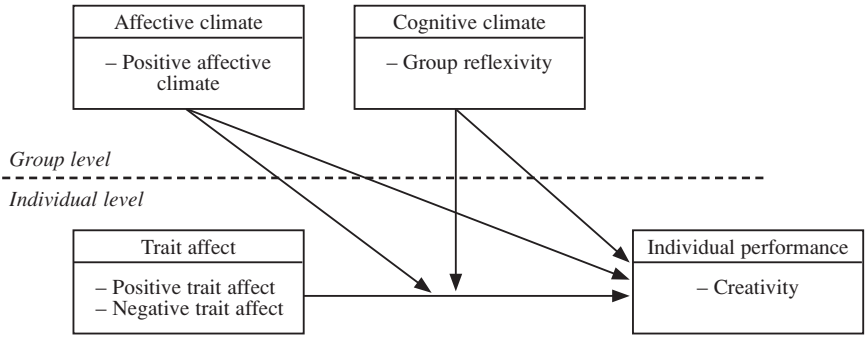

Figure 1. *Multilevel framework of affect–creativity relationships.*

Group climate can be used to predict the creative performance of members because it operates as an ambient stimulus that shapes and directs members' thinking, feelings, and interaction (Choi et al., 2003). Three explanations are offered for this group phenomenon: First, group climate may influence individual

affective processes both by providing a collective sense of reality concerning the immediate environment and by instigating either a gain or loss frame (Grawitch & Munz, 2005). Second, group climate may shape a psychologically safe environment that promotes the creative performance of individual members (West & Richter, 2008). Third, group climate may create norms that steer group members toward creativity (Choi et al., 2003). The first two explanations are related to group affective climate and the third is relevant to group reflexivity. The multilevel framework constructed for use in our study is set out in Figure 1.

Cross-Level Main Effects of Group Affective Climate

Despite the increasing attention of researchers on the effect of affect on creativity, there have been very few studies conducted in which the role of group-level affect in the context of creativity has been investigated. Although the relationship between group-level affect and individual creative performance has not been examined directly, we reasoned that group affective climate is likely to predict the creativity of members. First, group affective climate provides a collective sense of reality concerning the state of the work environment (George & King, 2007), and a positive affective climate signals an alignment with positive goals and outcomes to group members, thus eliciting a gain frame and promoting approach processes or a risk-taking style of cognitive strategies (Gray, 1990). In contrast, a negative affective climate indicates a problematic situation and retreat from goals, thus eliciting a loss frame and promoting avoidance processes or a risk-averse style of cognitive strategies. Therefore, affective climate can shape the decision frames that form individuals' mental calculation of the global risks they face.

Second, group affective climate affects group members' sense of psychological safety in relation to the interpersonal risk felt during group interaction (West & Richter, 2008). Psychological safety reduces the fear of appraisal and the social risk of losing face in the case of frequent failure associated with the experimentation of novel ideas (Edmondson, 1999). A positive affective climate is hypothesized to enhance members' creative performance by offering psychological safety and promoting free exchange and sharing of risky, and even unrealistic or unlikely, ideas among members (Bierhoff & Müller, 1999). By contrast, a negative affective climate is likely to engender tense and often destructive interactions among group members, exacerbating their reluctance to relax their guard and speak up and, ultimately, impairing creative performance (Grawitch & Munz, 2005).

Although, semantically, a negative affective climate may suggest the theoretical possibility that this is the opposite of a positive affective climate, the former is substantially less influential than is the latter in a group context (Damen, Van Knippenberg, & Van Knippenberg, 2008; Watson Clark, McIntyre, &

Hamaker, 1992). For example, although Watson et al. (1992) found no consistent relationship between negative affect and various social processes they did find consistent relationships involving positive affect. Barsade, Ward, Turner, and Sonnenfeld (2000) reported finding no effects of negative affective climate on social processes and outcomes, and suggested that negative affect is possibly related more to internal states, such as stress and psychopathology, but not to indicators of social activity and interpersonal exchanges. Damen et al. (2008) also demonstrated that positive affect is more influential than negative affect is when focusing on social interaction and affect congruency effects. It was found that this relative attenuation of the role of negative affective climate tends to be more salient in organizational teams in which members are more constrained in their public emotional displays (Mayer, Roberts, & Barsade, 2008). Therefore, we proposed the following hypothesis with a focus on positive, rather than negative, affective climate:

Hypothesis 1: Positive affective climate will be positively related to individual creativity.

Cross-Level Interaction Between Trait Affect and Group Affective Climate

Aside from its cross-level main effects, we expected that group affective climate would moderate the affect–creativity relationship at the individual level. Scholars have offered different views on how the valence of affect influences individual-level risk preferences and subsequent cognitive strategies to deal with the perceived risk. Schwarz (1990), for example, posited that individuals who are in a positive mood are inclined to take risks associated with novel solutions, assuming that the situation is considered safe. By contrast, individuals who are in a negative mood avoid risky, novel solutions on the assumption that this will prevent the current problematic state from worsening. These positions are consistent with threat-rigidity theory (Staw, Sandelands, & Sutton, 1981) and the approach-avoidance framework (Gray, 1990). Alternatively, Kaufmann and Vosburg (1997) assumed that positive affect generates a motive to retain the status quo and is, thus, related to risk aversion, whereas negative affect motivates individuals to change the situation that elicits negative feelings and promotes risk taking. This position has been confirmed by both the behavioral theory of organizations (Cyert & March, 1963) and the hedonic contingency perspective (Wegener & Petty, 1994).

As an important situational factor, group affective climate may determine these rather ambivalent effects of individual affect on creativity because it sets the shared reality for members and elicits either a gain or a loss decision frame, thereby promoting either approach or avoidance processes (Grawitch & Munz, 2005). According to Isen (2000), approach and risk-taking orientations become dominant when group members with positive affect believe that possible losses

are not salient, and that the same positive affect activates risk-averse orientations when possible losses are real and salient (see also Nygren, Isen, Taylor, & Dulin, 1996). We proposed that group affective climate would provide information on the decision frame and on potential gain and loss (either psychological or real) related to the current task and the interpersonal situation. In trait activation theory, it is also suggested that personality traits manifest in reaction to trait-relevant situational cues (Tett & Burnett, 2003).

Given the association between positive affective climate and a gain frame (Grawitch & Munz, 2005), we proposed that such an affective climate would provide cues relevant to a gain situation. This situation motivates individuals with positive trait affect to utilize their psychological slack toward creative efforts because a fearless mindset is triggered by their optimistic situation assessment or the gain frame that is induced by the positive affective climate (Isen, 2000). Similarly, although negative trait affect has an ambivalent potential to initiate both risk-taking and risk-averse processes, a positive affective climate is likely to channel the effect of negative trait affect toward risk-taking and approach orientations. When exposed to a positive affective group tone that signals opportunity and gain frame without much psychological burden or threat to members (Grawitch & Munz, 2005), those with trait negative affect face the possibility of overhauling the status quo, thus leaning toward the risk-taking motive. To sum up, we proposed the following cross-level moderation hypotheses:

Hypothesis 2a: The relationship between positive trait affect and creativity will be moderated by a positive affective climate, such that positive trait affect will be positively related to individual creativity when affective climate is very positive but not when it is less positive.

Hypothesis 2b: The relationship between negative trait affect and creativity will be moderated by a positive affective climate, such that negative trait affect will be positively related to individual creativity when affective climate is very positive but not when it is less positive.

Cross-Level Main Effects of Group Reflexivity

In a high group reflexivity context, members can learn from and integrate other members' views to generate creative solutions (van Ginkel, Tindale, & van Knippenberg, 2009). Thus, working under conditions of high group reflexivity is conducive to individual ideation because it stimulates divergent thinking through enhanced information sharing and learning from others (Urbach et al., 2010). De Dreu (2007) uses *reflexivity*, which is defined as the inclination to spend effort to achieve a thorough and rich understanding of the world, including the group task or the decision problem at hand, as a proxy for epistemic motivation. Group reflexivity may serve as a group norm that influences epistemic motivation of

group members, thereby encouraging a free, candid exchange of information and the laborious integration of information. Following this logic, we formulated our third hypothesis:

Hypothesis 3: Group reflexivity will be positively related to individual creativity.

Cross-Level Interaction Between Trait Affect and Group Reflexivity

Drawing upon the mood-as-input view and trait activation theory, we examined the interplay of trait affect and group reflexivity with regard to individual creativity. Specifically, we proposed that trait affect would exert a positive effect on individual creativity only when group reflexivity is high. Group reflexivity spawns a creativity-supportive environment in that creative requirements are clearly articulated in this condition (Unsworth, Wall, & Carter, 2005). By providing cues relevant to the creativity requirement and promoting the contextual structure or norms that encourage information sharing and learning (De Dreu, 2007), we hypothesized that group reflexivity would enhance creativity in individuals with both positive and negative trait affect.

By clarifying the creative requirements, group reflexivity serves as a group norm that channels psychological slack from positive affect toward creative efforts (Müller, Herbig, & Petrovic, 2009). Moreover, individuals with positive trait affect are more apt to engage in creative endeavors under a high level of group reflexivity than under the condition of a low level of group reflexivity, because increased group reflexivity stimulates feedback from other members and motivation toward creativity. However, when people who are in a positive mood are not allowed to receive feedback on their solutions, they tend to pursue a strategy for finding a satisfactory, instead of optimizing, strategy (Kaufmann & Vosburg, 1997). Thus, under the condition of a high level of group reflexivity, individuals with positive trait affect will persevere in working toward continuous improvement. By contrast, under the condition of a low level of group reflexivity, individuals with positive trait affect will quickly accept a strategy for a satisfactory solution.

High group reflexivity provides a supportive social context that offsets the restrictive thinking style of individuals with negative trait affect. Employees with negative affect tend to process information via rigid and narrow paths and have difficulty exploiting knowledge and information through unconstrained exchange of ideas with others (To et al., 2010). With group reflexivity as a norm, individuals with negative affect may be encouraged to participate in knowledge sharing and to take advantage of the constructive group processes, thus broadening the scope of consideration of solutions (Zhou & George, 2001). Therefore, group reflexivity can maximize the benefit of the systematic and thorough problem-solving efforts of those with negative affectivity (Schwarz, 1990). However, low group reflexivity may reinforce the constrained and

risk-averse strategy of individuals with negative trait affect. Thus, we proposed the following hypotheses:

Hypothesis 4a: The relationship between positive trait affect and creativity will be moderated by group reflexivity, such that positive trait affect will be more positively related to individual creativity when group reflexivity is high than when it is low.

Hypothesis 4b: The relationship between negative trait affect and creativity will be moderated by group reflexivity, such that negative trait affect will be more positively related to individual creativity when group reflexivity is high than when it is low.

Method

Research Setting, Participants, and Procedure

To test our hypotheses, we collected data from employees in two Korean organizations with a team-based structure, and in which team-level performance-based incentives were offered. In these organizations, members of the same team were physically collocated and interacted on a daily basis, thus providing an appropriate field setting for the current conceptual framework. In addition, each team had only one formal leader who held a position more senior than the rest of the team members in the organizational hierarchy. As team leaders frequently interacted with their team members, they were knowledgeable about each member's task performance and creativity. The participants performed various functions, including sales, human resources, finance, research and development, production, and quality control.

With the support of human resource managers who randomly selected 58 teams from the two organizations, we distributed supervisor survey forms to 58 team leaders and employee survey forms to 372 team members. Out of the forms distributed, 54 supervisor forms (93% response rate) and 338 employee forms (91% response rate) were returned. After deletion of employee surveys that were incomplete and failed to match with supervisor ratings, we had a final sample of 306 employees from 50 work teams (response rate = 82%). In the team-member sample (11.8% women; M_{age} = 31.47 years, SD = 31.47), the highest educational qualification was as follows: less than high school (1.1%), high school (16.3%), 2 years of college (40.8%), bachelor's degree (37.6%), and postgraduate qualification (4.2%). Their job positions were entry-level employee (47.1%), associate (15.0%), assistant manager (25.2%), department manager (10.5%), and not specified (2.2%). The average organizational tenure was 4.57 years (SD = 3.91), and the average group tenure was 2.77 years (SD = 3.10).

In the team leader sample (all male, M_{age} = 38.96 years, SD = 3.10), the average organizational tenure was 9.03 years (SD = 5.53), and the average group tenure

was 5.31 years (*SD* = 4.77). Leaders' educational qualifications included high school (14.6%), 2 years of college (27.1%), bachelor's degree (47.9%), and postgraduate qualification (10.4%). Their job positions were department manager (50%) and deputy general manager or higher (50%).

Measures

Positive and negative trait affect. The two scales we used were originally developed by Haslam (1995). Employees rated the following six items: "In general, I feel (a) delighted, (b) pleased, (c) happy, (d) angry, (e) distressed, and (f) frustrated," the first three of which assess positive trait affect, and the last three assess negative trait affect (α = .94 and .82, respectively). All ratings were made on a 10-point Likert scale ranging from 1 = *completely disagree* to 10 = *completely agree*.

Positive and negative affective climate. Although we focused on positive affective climate, we also controlled for negative affective climate for the sake of comprehensiveness. Affective climate was measured by the same set of items used for trait affect but modified with the group as the referent: "In general, while working together, group members share the following feelings: (a) delighted, (b) pleased, (c) happy, (d) angry, (e) distressed, and (f) frustrated." Employees rated these items on a scale ranging from 1 = *not at all* to 10 = *extremely*. The alpha reliabilities for the positive and negative affective climates were .96 and .90, respectively.

Group reflexivity. Adopting items from Patterson et al. (2005), we measured group reflexivity using a three-item index (α = .83): "In our group, we readily change the way we work together in order to improve performance," "We often discuss the methods used by our group in completing tasks," and "We hold regular discussions on whether people in our group work together effectively." Employees were asked to rate the items on a 7-point scale from 1 = *disagree* to 7 = *agree*.

Employee creativity. The outcome measure of employee creativity was assessed by supervisor rating. Adopting items used by Zhou and George (2001), we constructed a six-item measure of creativity (α = .93; e.g., "This employee suggests new ways to achieve our goals," and "This employee often has a fresh approach to problems"). Supervisors rated these items on a 7-point scale from 1 = *not at all* to 7 = *extremely*.

Data Aggregation

We investigated multilevel dynamics that involve group-level variables. Before we aggregated members' responses to the group level, we checked whether or not they had both sufficient within-group agreement and between-group variation. Agreement among members about group-level variables was measured with r_{wg}

(James, Demaree, & Wolf, 1984). The mean r_{wg} values for positive and negative affective climates and group reflexivity were .84, .76, and .81, respectively, indicating strong within-group agreement (LeBreton & Senter, 2008). Then, we estimated the intraclass correlation (ICC) statistics; ICC1 and ICC2 were .12 and .44, $F(49, 254) = 1.79$, $p < .01$ for positive affective climate; .08 and .34, $F(49, 253) = 1.51$, $p < .05$ for negative affective climate; and .22 and .63, $F(49, 256) = 2.73$, $p < .001$ for group reflexivity, respectively. Finally, we estimated eta squares (η^2) to estimate the strength of association among individual ratings. The η^2 values for positive and negative affective climate and group reflexivity were .26, .23, and .34, respectively, which are higher than Georgopoulos' (1986) criterion for aggregation of .20 (Choi et al., 2003). Overall, these group-level psychometric properties of the scales provide empirical justification for their group-level aggregation.

Results

Before testing the hypotheses, we assessed the empirical distinctness of the study variables by conducting a confirmatory factor analysis using the 21 items comprising the six study variables and calculating chi square, degrees of freedom, comparative fit index, Tucker-Lewis index, and root mean square error of approximation values. Table 1 shows that the six-factor structure fits the data better than do conceptually feasible alternative models (all $p < .001$ based on chi-square difference tests). Tables 2 and 3 present the means and standard deviations of, and intercorrelations among the individual- and group-level variables, respectively.

Hypotheses Tests

We employed hierarchical linear modeling (Raudenbush & Bryk, 1992) to test our hypotheses, the results of which are presented in Table 4. To begin our multilevel analysis, we created a model that included all demographic controls as well as individual trait affect variables (Model 1 in Table 4). This model also includes individual positive and negative trait affect aggregated at the group level to avoid potential level confounding (Zhang, Zyphur, & Preacher, 2009). In accordance with the ambiguous implications of positive and negative affect for creativity previously reported (George & Zhou, 2007; Martin et al., 1993), individual-level trait affect did not have a significant effect on creativity. By contrast, positive trait affect aggregated at the group level exhibited a significant positive effect on creativity. Together, these patterns suggest that individual trait affect may have more significant implications for individual creativity as a group-composition factor than as a personal attribute.

Table 1. *Confirmatory Factor Analysis of Nested Models*

Description	χ^2	*df*	χ^2/df	CFI	TLI	RMSEA
One-factor model	4053.51***	189	21.45	.31	.16	.26
Two-factor model [TA (PTA + PAC + NTA + NAC) + REF; CR]	2315.46***	188	12.32	.62	.53	.19
Three-factor model [TA (PTA + PAC + NTA + NAC); REF; CR]	1944.96***	186	10.46	.69	.61	.17
Four-factor model [PA (PTA + PAC); NA (NTA + NAC); REF; CR]	1091.14***	183	5.96	.84	.80	.13
Five-factor model 1 [PA (PTA + PAC); NTA; NAC; REF; CR]	884.49***	179	4.94	.87	.84	.11
Five-factor model 2 [PTA; PAC; NA (NTA + NAC); REF; CR]	661.22***	179	3.69	.91	.89	.09
Six-factor model [PTA; PAC; NTA; NAC; REF; CR]	430.44***	174	2.47	.95	.94	.07

Note. $N = 306$. CFI = comparative fit index, TLI = Tucker–Lewis index, RMSEA = root mean square error of approximation, PTA = positive trait affect, PAC = positive affective climate, NTA = negative trait affect, NAC = negative affective climate, REF = reflexivity, CR = creativity, TA = trait affect, AC = affective climate. *** $p < .001$.

Table 2. *Means and Standard Deviations of, and Correlations Among, Study Variables: Individual Level*

Variables	*M*	*SD*	1	2	3	4	5	6	7	8	9
1. Age	31.47	5.64	—								
2. Tenure	4.57	3.91	.46**	—							
3. Company	0.25	0.44	-.01	.32**	—						
4. Positive trait affect	6.29	1.66	-.06	-.01	.16**	—					
5. Negative trait affect	3.57	1.65	.13*	.07	-.09	-.32**	—				
6. Positive affective climate	5.88	1.79	.04	.01	.06	.67**	-.18**	—			
7. Negative affective climate	3.35	1.72	.19**	.11	-.03	-.21**	.60**	-.27**	—		
8. Group reflexivity	4.33	1.22	.07	-.01	.15**	.32**	-.01	.44**	-.08	—	
9. Creativity	4.61	1.09	.01	.05	.06	.16**	-.01	.19**	-.08	.05	—

Note. $N = 306$. * $p < .05$, ** $p < .01$.

Table 3. *Means and Standard Deviations of, and Correlations Among, Study Variables: Group Level*

Variables	*M*	*SD*	1	2	3	4	5	6
1. Aggregated positive trait affect	6.43	1.03	—					
2. Aggregated negative trait affect	3.52	0.80	-.26	—				
3. Positive affective climate	5.96	1.10	.69**	-.18	—			
4. Negative affective climate	3.35	0.95	-.20	.61**	-.43*	—		
5. Group reflexivity	4.47	0.73	.50**	-.16	.62**	-.26	—	
6. Creativity	4.59	0.70	.30*	.04	.47**	-.10	.27	—

Note. $N = 50$; * $p < .05$, ** $p < .01$.

Table 4. *Hierarchical Linear Models Predicting Creativity*

Variables	M1	M2	M3	M4	M5
Outcome: Creativity					
Individual-level process					
Age	.01	.01	.01	.01	.01
Tenure	.01	.01	.01	.01	.01
Company	-.02	.03	-.01	-.06	-.09
PTA	.05	.06		.09	.06
NTA	-.02		-.01	-.01	-.01
IPAC		.01	.04		.05
INAC		-.04	-.03		.03
IREF				-.09	.11
PTA × IPAC		.01			.01
PTA × INAC		-.03			.02
NTA × IPAC			-.01		
NTA × INAC			.01		
PTA × IREF				-.01	.02
NTA × IREF				.08*	.09

Table 4 continued

Variables	M1	M2	M3	M4	M5
Cross-level process					
PTA × PAC		.13**			.06
PTA × NAC		.16**			.13
NTA × PAC			.01		.08
NTA × NAC			-.10		-.02
PTA × REF				.12*	.13
NTA × REF				-.07	-.12
Group-level process					
Agg PTA	.23*	-.01	-.02	.17	.12
Agg NTA	.14	.12	.10	.11	.01
PAC		.32*	.33*		.28
NAC		-.01	-.01		.01
REF				.16	-.11
Agg PTA × PAC		-.01			.09
Agg PTA × NAC		.01			-.34
Agg NTA × PAC			-.02		.22
Agg NTA × NAC			.01		-.11
Agg PTA × REF				.01	-.17
Agg NAT × REF				-.04	.15
Pseudo R^2		.03	.02	-.02	.04

Note. * $p < .05$, ** $p < .01$. PTA = positive trait affect; NTA = negative trait affect; REF = group reflexivity; IPAC = individual perception of positive affective climate; INAC = individual perception of negative affective climate; IREF = individual perception of reflexivity; PAC = positive affective climate; NAC = negative affective climate; Agg PTA = aggregated positive trait affect; Agg NTA = aggregated negative affective climate.

Main effects of group climate. In Hypotheses 1 and 3, we proposed that positive affective climate and group reflexivity would predict members' creative performance. Results set out in Model 2 of Table 4 show that member creativity was significantly related to positive affective climate, supporting Hypothesis 1. Model 4 results in Table 4 demonstrate that group reflexivity was not significantly related to members' individual creativity. Thus, Hypothesis 3 was not supported.

Cross-level moderation by positive affective climate. In Hypotheses 2a and 2b, we proposed that positive affective climate would moderate the individual-level affect–creativity relationship. Considering the multicollinearity among predictors, we tested each of these hypotheses separately and the results are shown in Models 2 and 3 in Table 4, respectively. As reported in Model 4, negative trait affect did not show any interactions with group affective climate at the individual, cross-, or group levels of analysis. Therefore, Hypothesis 2b was not supported. However, as we had predicted, the cross-level interaction between positive affective climate and positive trait affect was significant. The interaction terms involving the same two variables at the individual and group levels were nonsignificant. The results clarify that the current interactive relationship is, indeed, a cross-level phenomenon instead of a purely psychological or collective process. We further probed into the significant cross-level interaction by comparing the slopes associated with the conditions of high and low positive affective climate (Aiken & West, 1991). As expected, Figure 2 shows that the group members' positive trait affect is positively related to their individual creativity when positive affective climate is high (b = .21, $p < .01$) but not when it is low (b = -.07, *ns*).

However, the results also show (Model 2 in Table 4) that positive trait affect interacts with negative affective climate to influence individual creativity. When we had performed the simple slopes analysis (Aiken & West, 1991), we found (see Figure 3) that group members' positive trait affect was positively related to their creativity when negative affective climate was high (b = .18, $p < .10$) but not when it was low (b = -.06, *ns*). This empirical pattern was unexpected and we have elaborated on this finding in the Discussion section.

Cross-level moderation by group reflexivity. In Hypotheses 4a and 4b, we posited that group reflexivity would moderate the individual-level affect–creativity relationship. Results of the test for this cross-level moderating effect are shown in Model 4 of Table 4. Group reflexivity significantly moderates the relationship between positive trait affect and creativity. Similar to the moderation by positive affective climate, the moderation by group reflexivity on the relationship between positive trait affect and creativity is also significant for the cross-level process but not at the individual or group levels. However, the moderation by group reflexivity of the relationship between negative trait affect and creativity is significant at the individual level, but not at either cross or group levels.

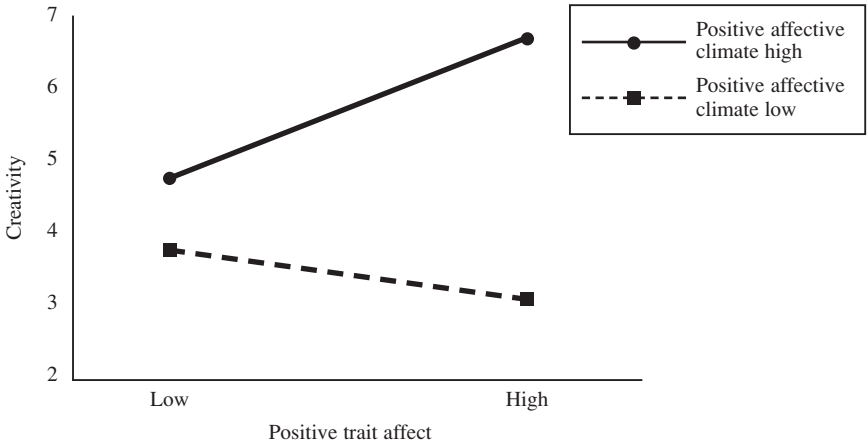

Figure 2. *Cross-level moderation effect of positive affective climate on the relationship between positive trait affect and individual creativity.*

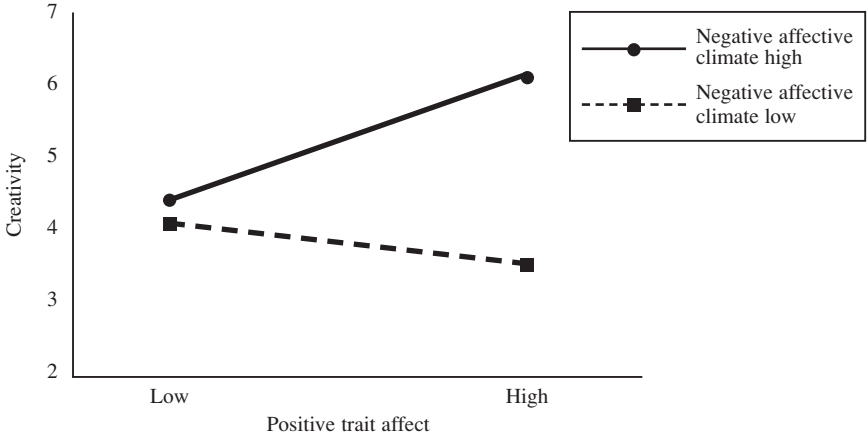

Figure 3. *Cross-level moderation effect of negative affective climate on the relationship between positive trait affect and individual creativity.*

We further explored the significant cross-level interaction, as shown in Figure 4, and found that the relationship between positive trait affect and creativity was positive when group reflexivity was high (b = .16, $p < .01$) but not when it was low (b = .01, *ns*). We also tested the significant individual-level interaction, finding that the relationship between negative trait affect and creativity was positive when group reflexivity was high (b = .44, $p < .05$) but not when it was low (b = .24, *ns*).

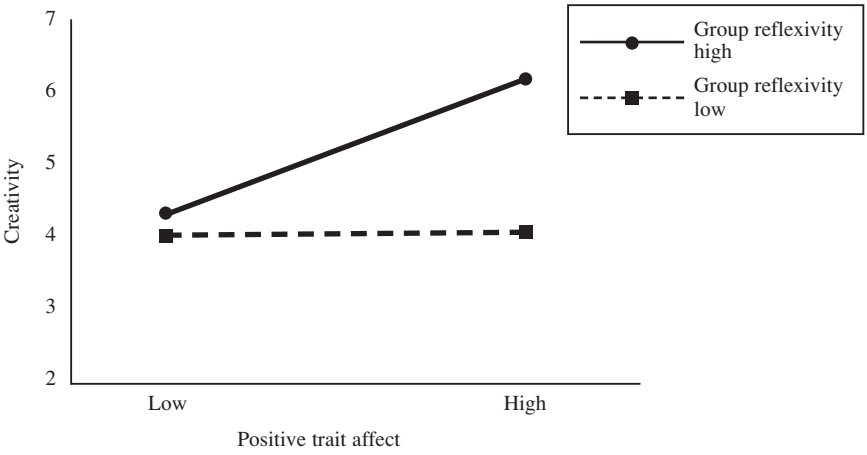

Figure 4. *Cross-level moderation effect of group reflexivity on the relationship between positive trait affect and individual creativity.*

Discussion

The theoretical propositions for our study and the empirical findings make meaningful contributions to the extant research on trait affect and creativity by clarifying the multilevel dynamics involved in the affect–creativity relationship in organizational work groups. The results of our analysis clearly indicate the significant role of positive affect at a group level, thus confirming the significant cross-level main effect of positive affective climate and the interactive effects of positive trait affect and positive affective climate in predicting employee creativity. Moreover, the results of our multilevel analysis show that the affect–creativity relationship depends on the presence of favorable and relevant contextual factors, such as group affective climate and reflexivity, further bolstering the accuracy of the context-dependent view of affect (Martin et al., 1993).

Theoretical Implications

Our results indicate the significant direct effect of positive affective climate, and its significant interactive effect on positive trait affect, in predicting individual creativity. These findings show that groups can promote creative performance by developing an affective climate in which group members feel supported and psychologically safe to learn and take risks (West & Richter, 2008). Some scholars have expressed concerns about potential dysfunctions of positive affective climate. As mood and emotions serve informational functions regarding individuals and their surroundings, affective convergence in groups may lead to the development of a single, shared reality that provides members

with a false sense of confidence and certainty, thus resulting in complacency, premature closure, and poor decision making, and leading to what has been termed *groupthink* (George & King, 2007). Despite these theoretical possibilities, we found no empirical evidence of potentially detrimental functions of a positive affective climate.

Considering that positive affective climate operates as a positive contextual moderator, it can be theorized that negative affective climate is a negative contextual moderator that may engender negative effects of affect on creativity. However, negative affective climate has been found to be substantially less influential than positive affective climate is in the group context, in that it shows no consistent relationship with various social processes and outcomes (Barsade et al., 2000; Damen et al., 2008; Mayer et al., 2008; Watson et al., 1992). Thus, we decided not to frame negative affective climate as a negative moderator of the affect–creativity relationship. However, the results show a counterintuitive pattern, whereby negative affective climate interacted with positive trait affect to enhance (rather than diminish) creativity. Contrary to our initial expectation, negative affective climate may have facilitating effects on individual creativity by motivating and pushing individuals with positive trait affect to strive with even more determination for excellence. Negative affective climate may provide feedback to members with positive affect that accepting a satisfactory outcome is not a plausible strategy, and may encourage them to put more effort in to find solutions and be flexible to identify alternatives (Kaufmann, 2003).

Another possibility is that, when the overall group affective tone is negative, members with positive trait affect offer distinct and valuable contributions to their group. For example, people with positive affect may provide unique cognitive approaches based on their optimism and risk-taking tendency, and supply passion, energy, and a certain level of nicety that are lacking in the negative, or—in its extreme form—toxic, group environment (Sanchez-Burks & Huy, 2009). There is also evidence that the salience is generated by the contrast between an individual group member's organizational citizenship behavior levels as compared to the context of a group's organizational citizenship behavior levels (Bommer, Dierdorff, & Rubin, 2007). Similarly, individuals who are highly extraverted may have heightened salience of the extraversion trait when they work in a low extraversion group, thereby accruing considerable personal benefits (Sung, Choi, & Kim-Jo, 2014). Thus, our findings regarding the positive interaction between positive trait affect and negative affective climate may reflect the distinct advantage of having positively oriented members in a mostly negative group context (cf. the contrast effect; Scherer & Lambert, 2009). However, it will be necessary to conduct further studies to explore this speculation in depth.

In the present study, we also included a cognitive climate that has received extensive attention as a facilitator of group creativity and innovation (West &

Richter, 2008). Group reflexivity enables group members to respond effectively to ambiguous, unstructured situations by learning from other members and constantly evaluating the efficacy of the group's task strategy and revising it as needed (van Ginkel et al., 2009; West & Richter, 2008). As previously noted, Müller et al. (2009) showed that clarifying creative requirements allowed group reflexivity to serve as a group norm that channeled psychological slack from positive affect toward creative efforts. Our results support our expectation that group reflexivity would draw members' attention to creative processes and cause them to channel their efforts toward creativity (main effect), thereby accentuating the benefit of positive trait affect for creativity (moderating effect). However, we did not find this cross-level moderation for negative trait affect, again highlighting the greater pertinence of positive, rather than negative, affect in employee creativity.

Study Limitations and Conclusion

The first limitation to this study is that data were collected at a single point in time; thus, the direction of causation cannot be established. In accordance with the prevailing theoretical endorsement that mood and affect guide subsequent motivational and cognitive processes (Schwarz, 1990), we employed the position that affect precedes cognition. However, it is difficult to identify the direction of the influence between affect and cognition because of the complex reciprocal relationships between emotion and cognition (Choi, Sung, Lee, & Cho, 2011). For instance, successful creative performance can build up positive affect among group members and reinforce their efficacy belief in cognitive processes. Further studies on alternative theoretical possibilities related to the potential reciprocal influence between affect and creativity are needed.

Second, we addressed a single dimension of affect, that is, the valence or hedonic tone of affect. Although the distinction between positive and negative affect is the most widely accepted dimension of affect, the affect–creativity relationship can be further examined based on other theoretically meaningful dimensions of affect, such as activation and regulatory focus (Baas, De Dreu, & Nijstad, 2008). Similarly, although we employed an operationalization of creativity that is widely used and well-validated in creativity research, future researchers may use alternative approaches, such as objective indicators (e.g., number of suggestions and patents submitted), to further validate and extend our results.

Third, we collected the data from people working in a manufacturing industry that is heavily populated with males; thus, our results may reflect norms that are distinct and different from other industrial settings. Moreover, the cultural values of Korean firms may affect the pattern of results we obtained. Korean society is often called collectivist, in that the group takes precedence over the individual.

The collectivist tendency of the participants may have exaggerated the contextual influences of group climate variables, which raises the issue of the limited generalizability of our findings. Further empirical studies that are conducted in diverse industrial and national settings should bolster understanding of the multilevel dynamics we observed.

Despite these limitations, our findings make meaningful theoretical and empirical contributions to the organizational creativity literature. The main theoretical contribution of our study lies in the multilevel conceptualization of the affect–creativity process, and we have also extended previous research by incorporating trait affectivity into the extant creativity research, which has typically been centered around transient moods or state affect. The observed cross-level main and moderating effects of group affective climate and reflexivity also offer critical empirical insights into employee creativity, confirming the context-dependency of the affective processes (Martin et al., 1993). Further conceptual and empirical work needs to be done to ensure a balanced consideration of both positive and negative moderating contingencies for the affect–creativity link. As we proposed and demonstrated, the affect–creativity link should be conceptualized as a context-dependent, multilevel phenomenon that requires further elaboration as regards its boundary contingencies.

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