Human Relations
DOI: 10.1177/0018726704044308
Volume 57(5): 531–552

SAGE Publications
London, Thousand Oaks CA,
New Delhi
www.sagepublications.com

Person–environment fit and creative behavior: Differential impacts of supplies–values and demands–abilities versions of fit

Jin Nam Choi

ABSTRACT

Numerous studies that have demonstrated interaction effects between individual and contextual factors suggest the potential positive effect of congruent personal and environmental characteristics on creativity. None of the prior studies, however, has explicitly and systematically tested the formal theory of person–environment fit in the context of creativity. This study examined the effects of two versions of person–environment fit (supplies–values and demands–abilities fit) on creative behavior and context satisfaction. The results, based on longitudinal data collected from management students and their instructors, showed that creative behavior was almost exclusively predicted by personal characteristics (desire for creative climate, actual creative abilities), whereas context satisfaction was strongly influenced by environmental characteristics (current creative climate, required creative abilities). The present results indicate a potential division of roles between personal and environmental characteristics with respect to affective and behavioral outcomes. Implications for research and practice are discussed.

KEYWORDS

creative behavior ▪ creativity ▪ demands–abilities fit ▪ person–environment fit ▪ supplies–values fit

Introduction

Creativity is becoming a core competency for employees and is encouraged in most contemporary organizations (Amabile, 1996). Although creativity can be observed at various levels of analysis including the individual, group, and organizational levels (Woodman et al., 1993), the ultimate source of creativity lies in individuals. Creativity at the higher levels of analysis (e.g. team creativity, organizational innovation) depends on the integration of individual creative potentials through synergistic interactive processes ('team creativity-relevant processes,' Taggar, 2002). Scholars of creativity have identified a host of individual characteristics associated with creative behavior, such as personality traits and motivation (Amabile, 1996; Gough, 1979), as well as environmental factors such as challenging work, freedom, sufficient resources, time for ideation, playfulness/humor, and support for ideas (Amabile et al., 1996; Isaksen et al., 2001; Tierney et al., 1999).

Like all other human behavior, creative behavior is certainly a function of both person and context (Woodman et al., 1993), and our understanding of the creative process is greatly improved by examining both individual and contextual variables (Kristof, 1996). Several recent studies have identified personal and contextual predictors of creativity, and theorized and empirically tested interrelationships between them. Most studies in this stream of research have confirmed interaction effects involving personal and contextual variables (Oldham & Cummings, 1996; Zhou & George, 2001), although some studies have reported mediational relationships between them (Scott & Bruce, 1994).

The interactions between personal and environmental factors reported in existing studies implicitly suggest that congruence between person and environment on relevant dimensions positively influences creative behavior. For example, a fit between leader and follower motivation (i.e. intrinsic motivation) was found to increase creative behavior (Tierney et al., 1999). These studies suggest that compatibility between person and environment is a critical condition for enhanced creativity. Given this line of thought, it seems reasonable to use the perspective of person–environment fit in creativity research. Thus far, only a small number of studies has explicitly adopted the formal theory of person–environment (P–E) fit in the domain of creativity (Livingstone et al., 1997; Puccio et al., 2000). These studies, however, have failed to comprehensively test the effects of different versions of P–E fit on individual creativity, and thus our understanding in this area is still quite limited.

The present study extends the literature on creativity and P–E fit in two important ways. First, it examines the effects of two different versions of P–E

fit (supplies–values fit and demands–abilities fit; Edwards, 1996) on creative behavior. Although Livingstone et al.'s (1997) study examined both versions of fit in the context of creativity, their dependent variables were limited to a set of affective variables (job satisfaction, strain, commitment) rather than creativity itself. Puccio et al. (2000) included creative performance as the outcome variable. However, in their study, the nature of the P–E fit construct (i.e. fit between ideal way of operation and required way of operation) was conceptually ambiguous and at best limited to only one aspect of fit (corresponding most closely to supplies–values fit). We therefore still do not know how the two versions of P–E fit are related to individual creativity. This study will provide preliminary answers to these relationships.

Second, this study also expands the P–E fit literature by testing potentially differentiated effects of the two types of P–E fit on affective and behavioral outcomes. Previous empirical studies have largely limited their investigation to the effects of P–E fit on affective outcomes such as job satisfaction, task strain, and commitment (Edwards, 1996; Kristof, 1996). The lack of studies integrating behavioral outcomes precludes a comprehensive understanding of how different versions of P–E fit influence various aspects of human behavior. This study will reveal how the two types of fit differentially influence affective and behavioral outcomes in the domain of creativity. Later I develop hypotheses linking the two versions of fit with two outcomes: creative behavior and context satisfaction. The hypotheses are then empirically tested through the analysis of longitudinal data collected from management students and their instructors.

The present study

Scholars of P–E fit have identified two types of fit between people and their environment (Kristof, 1996). The first type is *supplies–values fit* (S–V fit), which is present when the environment supplies attributes that are desired or valued by a person (Edwards, 1996). This type of fit is supplementary in the sense that person and environment possess fundamentally similar characteristics in terms of values or goals (Muchinsky & Monahan, 1987). The second type of fit is *demands–abilities fit* (D–A fit), which occurs when people have skills, knowledge, and other resources that are required by their environment (Edwards, 1996). This fit is complementary in the sense that a person supplies resources demanded by his/her environment (Muchinsky & Monahan, 1987). These two types of fit address different aspects of P–E fit that are characterized by distinct contents and functions linking person and environment. The present study examines how these two versions of P–E fit

predict affective and behavioral outcomes. Specifically, I propose that creative behavior will be promoted when individuals' creativity-related needs are met by the environment (supplies–values fit), and when they possess abilities that are sufficient to meet the situational demand for creativity (demands–abilities fit). In addition, drawing on Choi's (in press) study, I also propose that these two types of fit may have differential impacts on behavioral (creative behavior, in this study) and affective (context satisfaction) outcomes.

Effects of supplies–values fit on creative behavior and context satisfaction

In line with the conceptual definition of S–V fit presented earlier, in the current study, S–V fit is operationalized as the compatibility between desired climate for creativity (values) and current climate for creativity (supplies). Although researchers have attended to various environmental aspects including physical characteristics of the workplace, organizational structure and policy, and job characteristics (Oldham & Cummings, 1996; Stokols et al., 2002), climate for creativity, particularly psychological climate as perceived by individuals, has most often been examined as a critical social context that supports creativity (e.g. Amabile et al., 1996; Isaksen et al., 2001; Scott & Bruce, 1994; Stokols et al., 2002). Desired climate for creativity reflects a person's need for a social environment that promotes creativity (e.g. through challenge, mutual trust, free flow of ideas, encouragement from leaders and peers, N.R. Anderson & West, 1998). Current climate for creativity refers to a person's cognitive representations of the present environment with respect to creativity-promoting social characteristics such as encouragement of creativity from peers and leaders (Schneider & Reichers, 1983). Thus, S–V fit for creative climate is high when the environment provides a level of creativity-promoting climate that corresponds to the degree of value that a person places on it.

It is expected that supplies and values of creative climate are *optimally* related to creative behavior (optimal fit, Edwards, 1996): creative behavior will increase as the supply of creativity encouraging climate increases to the amount of creative climate desired, and then decreases as any additional supply of encouraging climate *exceeds* the desired amount. Many empirical studies have shown that social support and stimulation from leaders and peers have moderate, but significant, positive effects on individual creativity (Oldham & Cummings, 1996; Scott & Bruce, 1994; Tierney et al., 1999). An excessively supportive and stimulating situation beyond an individual's

desires, however, might operate as external distraction that reduces time for reflection and deliberation, and thereby begins to exert a negative impact on creative behavior (cf. 'interference,' Edwards, 1996). For example, if a person needs a quiet work environment for in-depth analysis and creative thinking, continuous 'stimulation' and support from friendly and outgoing colleagues are more likely to reduce her creative performance than to promote it. An oversupply of creative climate beyond the desired level, therefore, could actually decrease creative behavior. I also expect that creative behavior will be higher when both desired and current climate for creativity are high (high–high fit) than when both are low (low–low fit) because in the latter situation both personal needs and environmental support for creativity are weak.

> *Hypothesis 1a*: Creative behavior will increase as current creative climate approaches the level of desired creative climate, and decrease as current creative climate exceeds the level of desired creative climate.

> *Hypothesis 1b*: Creative behavior will be higher when desired and current creative climate are both high than when they are both low.

I expect a similar pattern of relationship between S–V fit for creativity and the present affective outcome: context satisfaction will be higher when the environment supplies a level of creativity encouraging climate that corresponds to the level of creative climate desired. In addition, high–high S–V fit will be related to greater context satisfaction than low–low S–V fit, because in the former case the environment offers a great deal of something a person values.

> *Hypothesis 2a*: Context satisfaction will increase as current creative climate approaches the level of desired creative climate, and decrease as current creative climate exceeds the level of desired creative climate.

> *Hypothesis 2b*: Context satisfaction will be higher when the desired and current levels of creative climate are both high than when they are both low.

Effects of demands–abilities fit on creative behavior and context satisfaction

Based on its conceptual definition, demands–abilities (D–A) fit is operationalized as the compatibility between creative abilities required by the

environment and creative abilities actually possessed by a person. Unlike S–V fit, I predict that D–A fit for creative abilities is *asymptotically* related to creative behavior (Edwards, 1996): creative behavior will increase as creative abilities possessed by an individual approaches the level of demand for creative abilities, but remain constant as actual creative abilities exceeds the contextual demand. Individuals are apt to increase their creative behavior to meet the demands from the environment as long as they can fulfill them. However, given that most social situations are highly capable of shaping individual attitudes and behavior (cf. strong situation, Davis-Blake & Pfeffer, 1989), when individuals have more than sufficient creative abilities, they may regulate their creative behavior level based on environmental demands, resulting in only partial utilization of their abilities. Although people are motivated to perform a behavior that they can do well based on their abilities (Vroom, 1964), they may perform the behavior only up to the level demanded by the situation (cf. asymptotic fit, Edwards, 1996).

> *Hypothesis 3*: Creative behavior will increase as actual creative abilities approach the level of required creative abilities, and remain stable as actual creative abilities exceed the level of required creative abilities.

To conceptualize the relationship between D–A fit and context satisfaction, I draw on Livingstone et al.'s argument (1997) and predict that context satisfaction will be high when the level of creative abilities demanded by the environment corresponds with the actual level of creative abilities held by a person (optimal fit). Both 'under-demand' and 'over-demand' situations will result in lower levels of context satisfaction by either under-utilization of an individual's capacities or the imposition of an unattainable task goal (Livingstone et al., 1997). Moreover, individuals will be more satisfied when the environment demands a great deal of creative abilities and they have a great deal to offer, than when the environment demands little and they do not have much to provide.

> *Hypothesis 4a*: Context satisfaction will increase as required creative abilities approach actual creative abilities, and decrease as required creative abilities exceed actual creative abilities.

> *Hypothesis 4b*: Context satisfaction will be higher when demand for and the actual level of creative abilities are both high than when they are both low.

Method

Data collection procedure and participants

The data for the present study were collected from undergraduate management students enrolled in an introductory course in organizational behavior at a North American business school. Participation was voluntary and rewarded with gift certificates offered through a draw. The course involved a total of 28 instructors teaching 430 students comprising 14 sections (each section was taught by two instructors, average class size = 31). All instructors had participated in intensive instructional training sessions that emphasized learning through experience and reflection, which occurred over a period of 3 months. The classes met twice a week for 2-hour sessions during the 13-week semester. Throughout the semester, less than a quarter of class time was spent on lecture. The majority of class time was devoted to discussions, exercises, and other activities designed for experiential learning. For this reason, the course required intense student participation, and instructors encouraged students to offer examples, personal points of view, and interesting questions for discussion.

Participating students completed survey questionnaires at the eighth week (T1) and the twelfth week (T2) of the semester. The instructors offered their evaluation of each student's creative behavior at the twelfth week (T2). Of the 430 students, 344 (response rate = 80.0 percent) completed the T1 questionnaire and 297 (response rate = 69.1 percent) completed both T1 and T2 questionnaires. Thus, when students' responses at T2 were used as the outcome variable, the sample size was 297. When instructors' ratings were the outcome, the sample size was 344. The present sample was 51.9 percent female. The average age and year of study at the university were 19.8 years and 2.1 (1 = Freshman, 2 = Sophomore, 3 = Junior, 4 = Senior), respectively.

Measures

The measures assessing S–V fit in creative climate and D–A fit in creative abilities were completed by students at T1. The dependent variables (creative behavior and context satisfaction) were assessed at T2; creative behavior was rated by the students themselves and by the instructors. Course satisfaction as a measure of context satisfaction was self-reported by students. The items used to measure each construct are described later. Each scale included multiple items and showed acceptable internal consistency. A 7-point Likert-type scale was used as the response format for all items.

Desired and current climate for creativity (T1)

Assessing S–V fit in creative climate involved comparing the current climate for creativity with the climate desired by participants. To make this comparison valid, I developed a commensurate measure for these two constructs (Edwards, 1996; Kristof, 1996). Specifically, I used the same 8-item measure to assess current climate ($\alpha = .83$) and desired climate ($\alpha = .72$) for creativity. These climate items were developed by adapting items from the Creative Environment Scale (Amabile & Gryskiewicz, 1989). Example items included 'The class is filled with a lively and active flow of ideas,' 'The class activities are challenging and involving,' and 'Instructors recognize students' creative behavior.' Participants were instructed to rate these eight climate statements with regard to (i) the extent to which they wanted these conditions in this particular class (desired climate) and (ii) the extent to which these conditions were actually present in the class (current climate).

Required and actual creative abilities (T1)

Assessment of D–A fit in creative abilities involved a comparison of the levels of required and actual creative abilities. Adapting the items of creativity developed by Zhou and George (2001), a 5-item index was developed to assess creative abilities, including items such as 'generating new ideas,' 'offering alternative explanations of a given phenomena,' and 'presenting creative solutions for a given problem.' Participants rated these ability statements twice, once for the extent to which each ability was *required* in the class (required abilities, $\alpha = .75$) and again for the extent to which they *currently possessed* each ability (actual abilities, $\alpha = .73$).

Self-rated creative behavior (T2)

At the end of the semester (T2), students were asked to rate their own creative behavior during the class. Drawing on existing measures of creative or innovative behavior (Oldham & Cummings, 1996; Scott & Bruce, 1994), I constructed a 3-item measure ($\alpha = .83$) that reflected potential forms of creative behavior given the structure and content of the class. The three items comprising this scale were 'In this class, I raised interesting issues and challenging questions for discussion,' 'I supplied new ideas and differing perspectives to the class,' and 'In this class, I actively listened to others and integrated their ideas to offer creative solutions.' The content of these items closely corresponded to the existing measures in its focus on generation of new and useful ideas, perspectives, or solutions.

Instructor-rated creative behavior (T2)

At the end of the semester, each of the two instructors responsible for the same class independently evaluated their students' level of creative behavior on a 7-point scale (1 = 'very little,' 7 = 'quite a lot'). In the evaluation sheet prepared for instructors, creativity was defined as 'The extent to which this particular student (1) is open to and actively listens to others' ideas; (2) generates and presents new/fresh ideas, alternative explanations, different perspectives, or other creative solutions; and (3) integrates multiple perspectives or combines ideas or materials from different modules in a constructive manner.' This explanation was prepared to cover a similar conceptual domain that was assessed in the items used in the self-rated creative behavior scale. The inter-rater agreement of the two instructors' ratings of creative behavior was acceptable (effective reliability of judges = .70, see Rosenthal & Rosnow, 1991), and the two instructors' ratings were averaged to create a mean instructor rating for each student.

Course satisfaction (T2)

Participants' satisfaction with the course was measured at the end of the semester using a 5-item scale (α = .80) that assessed their satisfaction with different aspects of the course including course content, classmates, and instructors as well as their overall satisfaction. This scale included items such as 'I am willing to take a course similar to this one in the future,' 'I am satisfied with my classmates,' and 'Instructors did an excellent job in leading this course.'

Results

Table 1 presents means, standard deviations, and correlations among the study variables. Prior to hypothesis testing, I conducted a confirmatory factor analysis of the present measures using EQS (Bentler, 1995) and examined the psychometric properties of these measures following J.C. Anderson and Gerbing's procedure (1988). The confirmatory factor analysis (CFA) of the seven latent factors indicated by 34 items resulted in a marginally acceptable model fit to the data ($\chi^2(506) = 1012.05$, $p < .001$; CFI7 = .85, RMSEA = .06). However, all measurement items were significantly loaded to their respective latent factors (all $p < .001$, but one), indicating convergent validity of the measures. Moreover, no confidence intervals of covariances among the latent factors (phi) included a value of one (all $p < .001$), indicating discriminant validity of the present measures.

Table 1 Means, standard deviations, and correlations among study variables

Variables	*M*	*SD*	*1*	*2*	*3*	*4*	*5*	*6*	*7*
1. Current Climate	5.83	.77	–						
2. Desired Climate	6.09	.70	.47***	–					
3. Required Abilities	5.27	.93	.49***	.31***	–				
4. Actual Abilities	5.17	.79	.22***	.37***	.31***	–			
5. Self-Rated Creative Behavior	5.00	1.21	.18**	.23***	.16**	.36***	–		
6. Instructor-Rated Creative Behavior	4.39	1.61	.08	.16**	.04	.19***	.35***	–	
7. Course Satisfaction	5.76	1.01	.37***	.24***	.25***	.05	.27***	.21***	–

* $p < .05$; ** $p < .01$; *** $p < .001$.

Analytic strategy: combining polynomial regression analysis and hierarchical linear modeling

For hypothesis testing, I conducted polynomial regression analyses to examine the distinct contributions of the personal and environmental characteristics to the outcome variables (Edwards, 1996). Specifically, I tested two regression equations in a hierarchical manner, one for testing linear effects, and another for curvilinear effects. In the following example, I entered desired climate (DC) and current climate (CC) into equations predicting creative behavior (CB):

$$CB = b_0 + b_1DC + b_2CC$$

$$CB = b_0 + b_1DC + b_2CC + b_3DC^2 + b_4DC*CC + b_5DC^2$$

If the second equation fails to significantly increase the explained variance, it is assumed that curvilinear effects are not present. With no curvilinear effect, the interpretation of the results is straightforward. However, interpretation would become more complicated if the three quadratic terms added to the second equation significantly increased the explained variance, indicating the presence of curvilinear effects. In this case, for a better interpretation of the results, the data points will be plotted on a three-dimensional response surface mapping the distribution of the three variables involved. This spatial mapping visualizes the observed pattern and facilitates interpretation of the results (Edwards, 1996).

In the present empirical context, which includes data from 14 sections, using ordinary least square (OLS) regressions for polynomial regressions might result in a biased estimation of coefficients. This is because it is likely that students from the same section share environmental perceptions, and thus their attitudes and behavior might be different from students in other sections, which presents the problem of interdependent observations (Van Yperen et al., 1999). In prior studies, this problem has often been dealt with by including dummy variables, although it has often been ignored, especially when the data were collected from a significant number of social units (e.g. more than 10 organizations). In the present data, the results of one-way analysis of variance (ANOVA) indicate that the variance shared among students from the same section was statistically significant for two of the three outcome variables (instructor-rated creativity and course satisfaction). To address the issue of significant shared variance in outcomes among students from the same section, I adopted multivariate hierarchical linear modeling (HLM; Bryk & Raudenbush, 1992) as an analytic tool for

conducting polynomial regression analyses. HLM is designed to analyze hierarchically nested data by estimating individual- and group-level variance simultaneously. This multilevel decomposition of variance provides statistically less biased test results than ordinary least-square regression analysis (for more information, see Bryk & Raudenbush, 1992). Later, I present two sets of polynomial regression analyses using HLM for S–V fit and D–A fit separately.

S–V fit in creative climate

Regarding S–V fit, I hypothesized that congruent levels of desired and current creative climate will be related to increased creative behavior and context satisfaction (i.e. optimal fit relationships). To test this hypothesis, I examined the linear and curvilinear effects of desired and current creative climate on the outcomes. In the present polynomial regression analyses, predictors were scale-centered in order to reduce multicollinearity. The first model of each set of polynomial regressions is a null model, containing no predictors. This model discomposes the total variance of the outcomes into two sources: within and between groups. Variance partitioning results indicate that only 2.1 percent (.0260/[1.2356 + .0260]) of total variance in self-rated creative behavior could be attributed to between-group differences, which was marginally significant ($p < .10$). For instructor-rated creative behavior and course satisfaction, however, group-level variance accounted for 17.4 and 14.2 percent of the total variance, respectively, and both were statistically significant ($p < .001$). In the present analyses, HLM was adopted as a tool for controlling for potential group-level covariations, rather than to test the effect of group-level predictors. Therefore, the following discussion of results is limited to the individual-level effects of predictors and their explanatory power indicated by a reduction in individual-level variance (sigma squared, χ^2), which corresponds to R^2 in OLS (Bryk & Raudenbush, 1992). Similar to unstandardized regression coefficients (bs), the coefficients appearing in Table 2 (s, individual-level coefficients of HLM analysis) can be interpreted as the magnitude of the effect of the predictor on the outcome, controlling for its group-level variation.

In terms of linear relationships, the creative behavior measures from both the self and instructors were significantly influenced by desired climate ($\alpha = .25$ and .42, respectively, both $p < .01$), but not by current climate. On the contrary, course satisfaction was significantly associated with current climate ($\alpha = .22$, $p < .01$), but not with desired climate. This pattern suggests a possibility that behavioral and affective outcomes are each influenced by different aspects of S–V fit.

Table 2 Polynomial regression analysis using hierarchical linear modeling

Dependent Variable	*Self-Rated Creative Behavior*			*Instructor-Rated Creative Behavior*			*Course Satisfaction*		
Model	*Null*	*Linear*	*Curvilinear*	*Null*	*Linear*	*Curvilinear*	*Null*	*Linear*	*Curvilinear*
1. S–V Fit in Creative Climate									
Current Climate		.09	.00		–.10	–.27		.22**	.23
Desired Climate		.25**	.04		.42**	1.26**		.12	.13
Current Climate^2			–.10			.05			.01
Current Climate * Desired Climate			.19*			–.01			–.02
Desired Climate^2			–.02			.20***			.01
Individual-Level Variance (σ^2)	1.2356	1.1950	1.1929	2.0921	2.0336	2.0054	.7877	.7451	.7510
Change in Variance ($\Delta\sigma^2$)		.0406	.0021		.0585	.0282		.0426	N/A
Proportion of Explained Variance		(3.3%)	(.2%)		(2.8%)	(1.4%)		(5.4%)	N/A
Group-Level Variance (τ)	.0260	.0274	.0275	.4408	.4430	.4440	.1307	.1326	.1324
2. D–A Fit in Creative Abilities									
Required Abilities		.08	.10		–.04	–.35*		.20**	.16
Actual Abilities		.38***	.26*		.43***	.63***		–.02	–.10
Required Abilities^2			–.06			.10			–.02
Required Abilities * Actual Abilities			.08			.11			.07
Actual Abilities^2			.03			–.17*			.00
Individual-Level Variance (σ^2)	1.2356	1.1354	1.1373	2.0921	1.9911	1.9742	.7877	.7588	.7594
Change in Variance ($\Delta\sigma^2$)		.1002	N/A		.1010	.0169		.0289	N/A
Proportion of Explained Variance		(8.1%)	N/A		(4.8%)	(.9%)		(3.7%)	N/A
Group-Level Variance (τ)	.0260	.0294	.0293	.4408	.4445	.4451	.1307	.1326	.1320

Note. Entries are unstandardized regression coefficients computed at the individual level of analysis, controlled for the group-level variation of the dependent variable.
*$p < .05$; **$p < .01$; ***$p < .001$.
N/A, not applicable.

In terms of curvilinear effects, the interaction term of desired and current climate significantly predicted self-rated creative behavior ($\alpha = .19$, $p < .05$). The square term of desired climate was significantly related to instructor rated creative behavior ($\alpha = .20$, $p < .001$). To better interpret the relationships between S–V fit and the three outcomes, the data were mapped on a three-dimensional space, as displayed in Figure 1. Plot A in Figure 1 shows a pattern consistent with Hypotheses 1a and 1b: (i) creative behavior increased as current climate approached desired climate, but declined as current climate exceeded desired climate; and (ii) creative behavior was higher when current and desired climate were both high. Although there was a slight curvature, plot B reverberates the results of the HLM analysis in that instructor-rated creative behavior was exclusively predicted by desired creative climate. Plot C shows a strong linear effect of current climate on course satisfaction along with a relatively weaker effect of desired climate.

In summary, the results provide mixed support for Hypotheses 1a and 1b: the hypothesized optimal fit relationship was observed in self-rated creative behavior, but not in instructor-rated creative behavior. The optimal fit relationship was not found in relation to course satisfaction (Hypothesis 2a not supported), but as hypothesized in Hypothesis 2b, course satisfaction was higher when desired and current climate were both high than when they were both low.

D–A fit in creative abilities

Regarding D–A fit, I hypothesized that creative behavior will be monotonically related to both required and actual creative abilities, whereas an optimal fit effect will be present for context satisfaction. The second row of Table 2 reports the results of polynomial regression analyses for testing these D–A fit hypotheses. The creative behavior measures reported by both students and instructors were influenced only by actual abilities ($\alpha = .38$ and .43, respectively, both $p < .001$), whereas course satisfaction was predicted only by required abilities ($\alpha = .20$, $p < .01$). These patterns only partially support the hypothesized monotonic fit relationship between D–A fit and creative behavior and optimal fit relationship between D–A fit and context satisfaction. However, similar to the results of S–V fit, the results indicate the possibility that affective and behavioral outcomes might be driven by different aspects of D–A fit.

In terms of curvilinear relationships, only the effect of the square term of actual abilities on instructor-rated creative behavior turned out to be significant. The results of three-dimensional mapping of the relationships involving D–A fit (plots D, E, and F in Figure 1) illustrate the strong linear

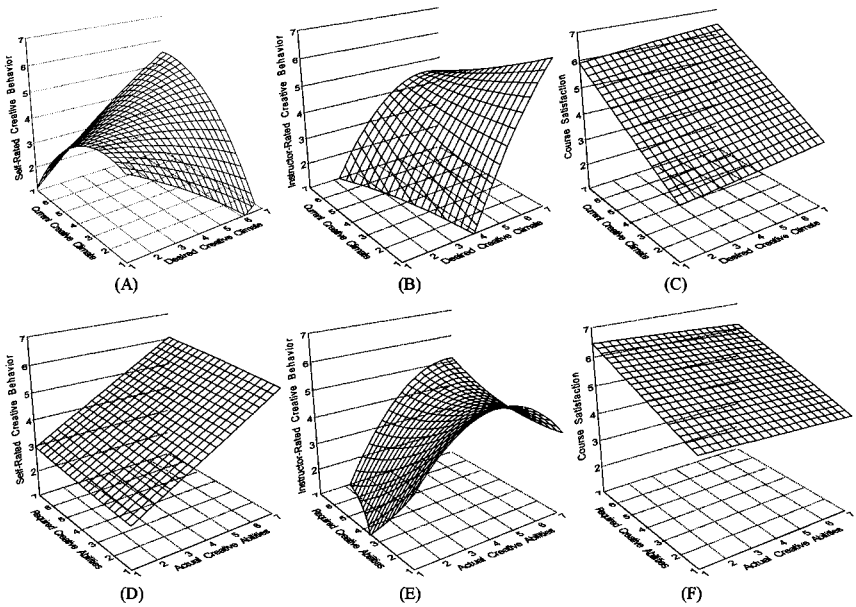

Figure 1 Response surfaces of two versions of P–E fit

effects of actual creative abilities on self-rated and instructor-rated creative behavior, and the moderate linear relationship between required creative abilities and course satisfaction.

Discussion

Drawing on the person–environment fit perspective, this study examined how creative behavior of individuals is influenced by S–V and D–A fit. In addition, it simultaneously investigated affective and behavioral outcomes, comparing their distinct relationships with the two versions of P–E fit. As hypothesized, the relationship between S–V fit and self-rated creative behavior was reflective of the optimal fit model (see plot A). Also, partially supporting the hypotheses, the two different measures of creative behavior were monotonically related to actual creative abilities (see plots D and E). The present findings contribute to both the creativity and the P–E fit literature by providing a clearer understanding of how two different versions of P–E fit influence creative behavior, and how they are differentially related to affective and behavioral outcomes.

The literature has thus far offered very limited information regarding the relationship between P–E fit and creative behavior, let alone behavior in general. Numerous prior studies have demonstrated interaction effects between personal and contextual variables on creative performance (e.g. Oldham & Cummings, 1996), suggesting a positive effect of 'matching' personal and environmental characteristics. These studies, however, were not designed to explicitly test the formal theory of P–E fit in the context of creativity, and in most cases focused only on the S–V aspect of fit. Livingstone et al. (1997) operationalized S–V and D–A versions of fit in relation to creativity, but they did not include creativity as an outcome. Puccio et al.'s (2000) study looked at the effect of 'Demands–Values' fit on creativity ('the type of person the respondent was required to be at work' versus 'how he or she would like to be in his or her ideal job'), an operationalization which precluded any comparison of their results with prior P–E fit studies based on either S–V or D–A versions of fit. The current study is the first attempt to systematically test the effects of both versions of fit on creative behavior.

Distinct roles of personal and environmental characteristics

Although the data support some of the fit hypotheses, a more striking and consistent pattern emerging from the present data was that affective and behavioral outcomes were influenced by different sets of variables that were mutually exclusive, rather than by either optimal or asymptotic fit relationships between person and environment. This unexpected, but quite intriguing, finding can be summarized as follows: (i) both creative behavior measures (self-reported and instructor-reported) were significantly influenced only by desired creative climate (values) and actual creative abilities (abilities); and (ii) the present affective outcome (course satisfaction) was strongly predicted by current creative climate (supplies) and required creative abilities (demands). This pattern raises an interesting question regarding the roles of personal and environmental factors with respect to attitudes and behavior of individuals.

The pattern observed in this study suggests that behavioral outcomes (creative behavior) are more strongly influenced by personal characteristics (values and abilities), whereas affective outcomes (context satisfaction) are more closely aligned with environmental characteristics (supplies and demands). The former finding is particularly surprising in the context of creative behavior because many prior studies that have investigated contextual predictors of individual creativity have found that supportive climate (supplies) and challenging tasks (demands) have significant effects on creative behavior (e.g. Amabile & Gryskiewicz, 1989; Oldham & Cummings, 1996).

Apparently, the present findings cannot be directly compared to these previous results because the present research design, which involves commensurate measurement of conceptually comparable personal and environmental variables, addresses fundamentally different research questions than those addressed by prior studies, which compare relatively unrelated personal and contextual variables (e.g. self-efficacy and top management openness). Nevertheless, the consistent weak or insignificant impact of environmental factors on creative behavior merits some further discussion and potential reconciliation.

One possible reason for the insignificant role of environment in creative behavior might lie in the fact that the present research setting was relatively homogeneous – all classes were structured in a similar way and all instructors were trained to encourage creativity during class. The present data, therefore, may represent only a limited environmental scope in terms of supplies and demands related to creativity. This possible restriction of scope of environmental variables might reduce their explanatory power. Another potential reason lies in the situation strength of the current empirical setting. As documented by Davis-Blake and Pfeffer (1989), individual dispositions are more pronounced and more likely to affect behavior when people are in weak situations than in strong situations. It is possible that for the present sample of students, the present research setting was only one of many courses they were enrolled in and the classroom setting may comprise a fairly weak situation for them. Particularly, given that their final grade was largely determined by their performance on examinations and written assignments, they might not have been overly concerned about classroom participation. Given these alternative explanations, we need to be cautious about interpreting the present findings. Despite these other possibilities, the contrasting relational patterns between the two versions of fit (S–V and D–A) and the two types of outcomes (behavioral and affective) were quite consistent and beg further research attention.

Livingstone et al.'s (1997) study, in fact, showed a pattern similar to the one found in this study with respect to affective outcomes. Of the 14 polynomial regression equations predicting three affective outcomes, environmental factors (supplies or demands) turned out to be a significant predictor in 13 equations, but personal characteristics (values or abilities) were significant in only one equation. These authors thus concluded that 'the most impressive influence on strain, job satisfaction, performance, and commitment was the environmental influence; particularly supplies for creativity. These results underscore the importance of focusing on the environment in future studies' (Livingstone et al., 1997: 139–40). The present findings, however, indicate that Livingstone et al.'s conclusion

emphasizing the role of the environment is valid only for affective outcomes, and that personal characteristics may play a critical role in behavioral outcomes such as creative behavior, but not in affective outcomes. These complementary findings clearly demonstrate the importance of creating and testing a fully specified model without excluding key variables.

The current results, along with prior studies (Choi, in press; Livingstone et al., 1997), clearly illustrate the need to rethink the concept of P–E fit and its expected relationships with various outcomes. It is possible that the underlying dynamics involving the person and the environment may vary depending on their content domains (values versus abilities), their relative levels (high versus low), their implications for the outcomes in question (positive, neutral, negative), and potential organizational influences on their relationship with the outcomes (presence of global moderating variables). These possibilities suggest fruitful venues for further conceptual and empirical effort.

Limitations, implications, and future directions

Although several features of the present research design, such as longitudinal data collection and the use of multiple external raters, improve the internal validity of the findings, we should be cautious about generalizing the present findings to other settings, particularly the workplace. It is quite plausible that organizational settings are 'stronger' situations than the current educational setting, because individuals may experience more intensive social norms and have a greater personal stake in the workplace (Davis-Blake & Pfeffer, 1989). It is likely that different social settings generate different person–environment dynamics. Therefore, although the present findings offer some insights consistent with the patterns observed in business organizations (Choi, in press; Livingstone et al., 1997), they are only indicative of potential patterns that might occur in other social settings. Thus, a natural extension of the present study would be to test the effects of S–V and D–A fit on affective, behavioral, and performance outcomes in various social settings. In addition, given the above-mentioned possibility of range restriction of environmental supplies and demands in the current empirical setting, an experimental study in which environmental characteristics could be manipulated to increase their variation would be a promising approach to examine whether a similar pattern can be obtained in less restricted environmental settings.

With the concern of limited external validity in mind, the present study provides several practical suggestions for instructors as well as managers. The pattern reported here indicates that creative behavior can be largely driven by individual characteristics pertinent to creativity (such as values and

abilities) with the environment exerting a relatively small influence. This pattern might be more pronounced when the context comprises a weak situation in which people do not share clear behavioral expectations (Davis-Blake & Pfeffer, 1989) or where people are not motivated to comply to environmental demands. Given that the current workplace is often characterized by increasing levels of empowerment and temporary relationships such as virtual collaboration, employees' creative performance will be more strongly determined by their voluntary contributions as a manifestation of their inherent values and abilities. Under these temporal and tenuous organizational situations, therefore, identifying individuals with adequate levels of creative values and skills might be crucial to produce creative solutions.

Once employees are assigned to tasks that require substantial creativity, in addition to creating social and physical environments that promote creativity, an attempt to directly enhance creative abilities through various forms of creativity training (e.g. divergent thinking, using heuristic tools, see Smith, 1998) may be an effective way to increase creative behavior. Creativity training or modeling of creative behavior by managers seems to increase creative behavior through increased efficacy related to creativity (Tierney & Farmer, 2002). Similarly, in a classroom setting, modeling creative behavior by instructors and introducing strategies for creative thinking may effectively promote students' creative contributions by enhancing their creative abilities and efficacy beliefs regarding creative behavior.

A typical expectation in the P–E fit literature is that a fit between comparable dimensions of person and environment will lead to favorable individual outcomes (e.g. high job satisfaction, low job strain). The present results, however, indicate that in some cases individual outcomes are predominantly determined by either a personal characteristic or an environmental factor. Furthermore, recent empirical evidence in the literature (including this study) indicates a possibility that supplies and demands from the environment are responsible for individuals' affective reactions to it, whereas values and abilities of individuals tend to determine their actual behavior or performance. Revealing the most significant factor (person or context) contributing to the target outcomes (e.g. organizational commitment, job satisfaction, creative performance, innovation use, OCB) will lead to a more efficient allocation of limited organizational resources by informing managers of the most powerful leverage points for effecting desired changes in individuals. In this regard, the present findings indicate that interventions should be specifically tailored to their target outcomes (i.e. changing attitudes or behavior).

The present study indicates several directions for further theoretical and empirical efforts to clarify the person–environment dynamics with respect to various areas of human behavior. First, it is possible that the effects of S–V or D–A versions of fit on creative behavior can be mediated by immediate psychological predecessors of creativity such as creative self-efficacy, context satisfaction, psychological safety or feeling of security, perceived freedom, and a boosted sense of efficacy (general or creativity-specific) based on the belief that the context matches one's own desires, style, and abilities (Tierney & Farmer, 2002). Identifying mediating mechanisms between person–environment fit constructs and behavioral outcomes would be an interesting research agenda for the future. Second, person–environment relationships are not static, but rather dynamic, and they can be better understood by examining their mutual influence patterns over time using a longitudinal research design. It is very likely that a person may shift his/her desire or values regarding creativity according to the context or vice versa. Examining this time-dependent fluctuation of corresponding personal and environmental factors and the process of obtaining the person–environment equilibrium may lead to intriguing findings. Third, and related to the second point, the idea of 'stretch' may provide an alternative perspective for understanding person–environment dynamics, enriching our conceptualization based on fit (Edwards, 1996). For example, people may be more strongly motivated by situations in which they need to put in extra effort to meet demands or change the situation so that it better serves their needs. Apparently, the exact amount of either positive or negative gap between corresponding personal and environmental attributes under which people can still maintain mental resiliency and actually perform better poses an intriguing, but challenging, agenda for further research efforts.

Acknowledgement

This research is partially supported by an Internal SSHRC Grant from McGill University. The author thanks Troy Anderson for his research support and valuable comments on an earlier version of this article.

References

Amabile, T.M. *Creativity in context: Update to the social psychology of creativity*. Boulder, CO: Westview Press, 1996.

Amabile, T.M., Conti, R., Coon, H., Lazenby, J. & Herron, M. Assessing the work environment for creativity. *Academy of Management Journal*, 1996, *39*, 1154–84.

Amabile, T.M. & Gryskiewicz, N.D. The creative environment scales: Work environment inventory. *Creativity Research Journal*, 1989, *2*, 231–53.

Anderson, J.C. & Gerbing, D.W. On the assessment of unidimensional measurement: Internal and external consistency, and overall consistency criteria. *Journal of Marketing Research*, 1988, *14*, 432–7.

Anderson, N.R. & West, M.A. Measuring climate for work group innovation: Development and validation of the team climate inventory. *Journal of Organizational Behavior*, 1998, *19*, 235–58.

Bentler, P.M. *EQS structural equation program manual*. Los Angeles, CA: BMDP Statistical Software, 1995.

Bryk, A.S. & Raudenbush, S.W. *Hierarchical linear models*. Newbury Park, CA: Sage, 1992.

Choi, J.N. Individual and contextual dynamics in innovation-use behavior in organizations. *Human Performance*, in press.

Davis-Blake, A. & Pfeffer, J. Just a mirage: The search for dispositional effects in organizational research. *Academy of Management Review*, 1989, *14*, 385–400.

Edwards, J.R. An examination of competing versions of the person–environment fit approach to stress. *Academy of Management Journal*, 1996, *39*, 292–339.

Gough, H.G. A creative personality scale for the adjective checklist. *Journal of Personality and Social Psychology*, 1979, *37*, 1398–405.

Isaksen, S.G., Lauer, K.J., Ekvall, G. & Britz, A. Perception of the best and worst climates for creativity: Preliminary validation evidence for the Situational Outlook Questionnaire. *Creativity Research Journal*, 2001, *13*, 171–84.

Kristof, A.L. Person–organization fit: An integrative review of its conceptualizations, measurement, and implications. *Personnel Psychology*, 1996, *49*, 1–49.

Livingstone, L.P., Nelson, D.L. & Barr, S.H. Person–environment fit and creativity: An examination of supply–value and demand–ability versions of fit. *Journal of Management*, 1997, *23*, 119–46.

Muchinsky, H.A. & Monahan, C.J. What is person–environment congruence? Supplementary versus complementary models of fit. *Journal of Vocational Behavior*, 1987, *31*, 268–77.

Oldham, G.R. & Cummings, A. Employee creativity: Personal and contextual factors at work. *Academy of Management Journal*, 1996, *39*, 607–34.

Puccio, G.J., Talbot, R.J. & Joniak, A.J. Examining creative performance in the workplace through a person–environment fit model. *Journal of Creative Behavior*, 2000, *34*, 227–47.

Rosenthal, R. & Rosnow, R.L. *Essentials of behavioral research: Methods and data analysis*, 2nd edn. New York: McGraw-Hill, 1991.

Schneider, B. & Reichers, A. On the etiology of climates. *Personnel Psychology*, 1983, *36*, 19–39.

Scott, S.G. & Bruce, R.A. Determinants of innovative behavior: A path model of individual innovation in the workplace. *Academy of Management Journal*, 1994, *37*, 580–607.

Smith, G.F. Idea generation techniques: A formulary of active ingredients. *Journal of Creative Behavior*, 1998, *32*, 107–34.

Stokols, D., Clitheroe, C. & Zmuidzinas, M. Qualities of work environments that promote perceived support for creativity. *Creativity Research Journal*, 2002, *14*, 137–47.

Taggar, S. Individual creativity and group ability to utilize individual creative resources: A multilevel model. *Academy of Management Journal*, 2002, *45*, 315–30.

Tierney, P. & Farmer, S.M. Creative self-efficacy: Its potential antecedents and relationship to creative performance. *Academy of Management Journal*, 2002, *45*, 1137–60.

Tierney, P., Farmer, S.M. & Graen, G.B. An examination of leadership and employee creativity: The relevance of traits and relationships. *Personnel Psychology*, 1999, *52*, 591–620.

Van Yperen, N.W., Van den Berg, A.E. & Willering, M.C. Towards a better understanding of the link between participation in decision-making and organizational citizenship behavior: A multilevel analysis. *Journal of Occupational and Organizational Psychology*, 1999, *72*, 377–92.

Vroom, V.H. *Work and motivation*. New York: Wiley, 1964.

Woodman, R., Sawyer, J. & Griffin, R. Toward a theory of organizational creativity. *Academy of Management Review*, 1993, *18*, 293–321.

Zhou, J. & George, J.M. When job dissatisfaction leads to creativity: Encouraging the expression of voice. *Academy of Management Journal*, 2001, *44*, 682–96.

Jin Nam Choi is an Assistant Professor of Organizational Behavior at the Faculty of Management, McGill University. He earned his PhD in Organizational Psychology from the University of Michigan. His current research interests include team processes and effectiveness in organizational settings, innovation implementation at the individual and team levels of analysis, individual and contextual determinants of individual and team creativity, and impacts of social networks on knowledge and creativity in organizations.

[E-mail: jinnam.choi@mcgill.ca]