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ORIGINAL PAPER

Organizational innovation climate and individual innovative behavior: exploring the moderating effects of psychological ownership and psychological empowerment

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Abstract The present study proposes that psychological ownership for the organization and psychological empowerment are important determinants of individual innovative behavior, and serve as moderators of the climate–innovation relationship. In a study of 804 employees from 157 firms in China, we found that both of these two psychological variables had a positive relationship with individual innovative behavior. Additionally, we found psychological empowerment served as a moderator of the climate–innovation relationship, such that the relationship was stronger for individuals high in psychological empowerment. This study contributes to further understanding of the climate–innovation relationship.

Keywords Organizational innovation climate · Individual innovative behavior · Psychological ownership · Psychological empowerment · Moderators

Mathematics Subject Classification 90B70

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1 Introduction

Organizational innovative climate plays a significant role in promoting individual innovative behavior which makes a great contribution to organizational effectiveness and long-term survival (Scott and Bruce 1994), especially in current rapidly changing business environment (Pieterse et al. 2010). There is a strong belief that the stimulation to innovate comes from the inspiring nature of the climate. Prior research has shown support for the organizational climate–innovative behavior link (Scott and Bruce 1994; Madrid et al. 2014; Wallace et al. 2016). However, empirical findings for the relationship of organizational climate and innovative behavior seem to be more complex (Hunter et al. 2007). One possible explanation could be the presence of moderators. Actually, how and under what conditions organizational climate influences innovative behavior needs further investigation.

Prior studies have indicated that there are a variety of important antecedents to individuals' innovation, such as individual differences (e.g., Montani et al. 2014; Madrid et al. 2014), individual social relationships (e.g., Wang et al. 2015), job characteristics (e.g., De Spiegelaere et al. 2014; Shin et al. 2017), group context (e.g., Hülsheger et al. 2009; Shin et al. 2012), and organization culture and climate (e.g., Montani et al. 2014; Madrid et al. 2014). Further, a small number of studies on individuals' innovation have identified a set of psychological predictors, including psychological traits (e.g., Michael et al. 2011) as well as psychological processes (e.g., Yuan and Woodman 2010). However, few of these studies have investigated the potential psychological mechanisms through which organizational climate impact individual innovative behavior. As Yuan and Woodman (2010) pointed out, "research evidence regarding the intermediate psychological processes that would explain how and why different individual and contextual antecedents affect innovative behavior remains inconclusive and underdeveloped". To a certain extent, the effect of critical psychological processes on individual innovative behavior has received less research attention, as well as their roles as potential moderators of the climate–innovation relationship. This study sheds light on the question of how and under what conditions organizational climate would lead to higher level of innovative behavior. Our understanding of the relationship between organizational climate and innovative behavior may benefit from the identification of intervening variables on which these relationships are contingent and that helps to predict and understand when these relationships would be stronger. In the present study, we focus on two individual psychological constructs of motivation as determinants of individual innovative behavior: psychological ownership for the organization (PO-O: self-consistency and/or self-enhancement motivation) and psychological empowerment (PE: intrinsic task motivation). We propose that they moderate the relationship of organizational innovative climate and individual innovative behavior.

PO-O reflects individuals' feelings of ownership toward their organization, with a sense of pride, and responsibility and obligation to devote more effort that lead to high performance and innovative behavior (Pierce et al. 2001). Based on the self-consistency and/or self-enhancement theory (Korman 1976; Epstein 1973; Jones

1973; Shrauger 1975), individuals with high level of PO-O view the organization as a significant part of the sense of self, and are motivated to exhibit more innovative behavior to maintain or enhance the self-concept as a worthy and need-satisfying individual than those with low level of PO-O. Thus, the organizational climate–innovative behavior link depends on employees' developing a sense of PO-O, such that the relationship is stronger with high PO-O and weaker with low PO-O. To our knowledge, few studies have followed with interest PO-O as a determinant of individual innovative behavior. The scarcity of empirical evidence directly speaking to the relationship between PO-O and individual innovative behavior makes it valuable to extend the body of evidence. Spreitzer (1995) described PE as an employee's perception of having competence, self-determination and influence, and the meaning of their work (p. 1443). Willingness and competence are both important to promote individual innovative behavior (Pieterse et al. 2010). Organizational innovative climate increases employees' willingness to behave innovatively, and PE makes them feel competent and able to influence their jobs and work outcomes in meaningful ways (Pieterse et al. 2010). Organizational innovative climate allows employees high in PE to actually make use of the possibility to take initiative, leading to more innovative behavior than those low in PE. Hence, the organizational climate–innovative behavior relationship is more positive with high PE and less positive with low PE. The overall theoretical framework is depicted in Fig. 1.

This study makes two contributions to the literature. First, it takes an initial step toward examining the relationship of PO-O and individual innovative behavior. Drawing on the self-consistency and/or self-enhancement theory, we demonstrate that individuals high in PO-O are more likely to perform innovatively. Second, we identify the moderating role of PE to the effectiveness of climate in engendering individual innovative behavior. Our results show that organizational innovative climate allows employees high in PE to actually make use of the possibility to take

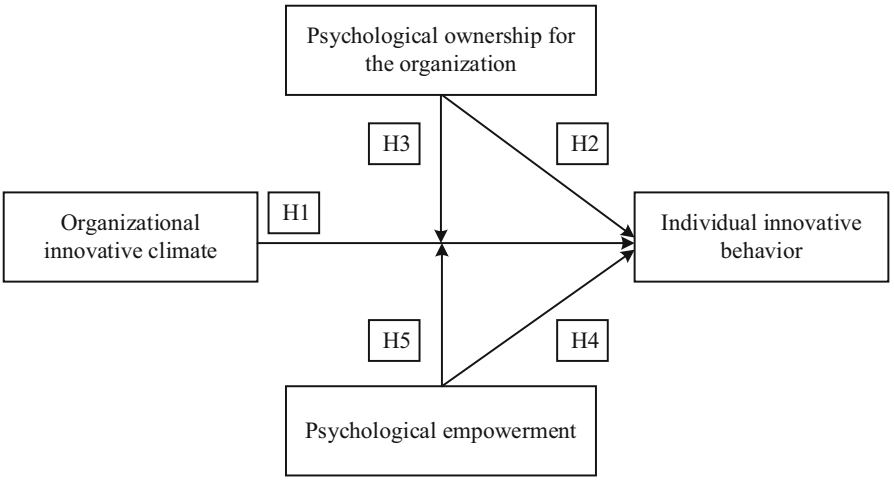

Fig. 1 Theoretical framework

initiative and engage more innovative behavior, whereas organizational innovation climate is less strongly related to individual innovative behavior for those who low in PE. It responds to the call for more attention to the moderating variables in the relationship between climate and innovative achievements (Anderson et al. 2004; Hunter et al. 2007) as well as more consideration of both personal and contextual factors to stimulating innovation in work organizations (e.g., Oldham and Cummings 1996).

In the following sections, we first review the relevant studies on the relationship among organizational innovative climate, PO-O, PE, and individual innovative behavior. Based on the literature review, we elaborate that organizational innovative climate, PO-O, and PE, respectively, have a positive relationship with individual innovative behavior, and both PO-O and PE are important moderators of the relationship between organizational innovative climate and individual innovative behavior. We then test the hypotheses and present the results from the analysis of data using 804 employees from 157 firms in China. Finally, we conclude by discussing the implications of the findings for research and practices.

2 Theoretical background and hypotheses

2.1 Organizational innovative climate and individual innovative behavior

Climate is often described as employees' experience and perception of the organization. Climate is "reflected in peoples' perceptions of, or beliefs about, environmental attributes shaping expectations about outcomes, contingencies, requirements, and interactions in the work environment" (Hunter et al. 2007). Following van Vianen and Prins (1997), climate is treated as an individual construct that reflects an orientation based on personal values (climate perception) in the present study. In addition, climate is a domain referenced phenomenon, and we put emphasis on climate for innovation in the present study. Therefore, organizational innovative climate is treated as "perceived" climate, that is, individual perception of the organizational innovation orientation in our study.

Individual innovative behavior is defined as a complex set of actions consisting of three different activities in the workplace: generating, promoting, and realizing novel ideas (Scott and Bruce 1994; Janssen 2000). The concept of individual innovative behavior emphasizes the process of innovation rather than the result. Specifically, generating novel ideas involves contributing and introducing new ways and solutions of performing work tasks, and the ideas can be either original or adapted from existing products, services, and work procedures (Kanter 1988). Promoting novel ideas includes seeking and gaining stakeholder approval and sponsorship for novel ideas from colleagues, supervisors, or managers (Kanter 1988). Realizing novel ideas contains facilitating the implementation of new ideas and converting them into products, services, or work procedures that can improve the individual and organizational effectiveness (Kanter 1988; Scott and Bruce 1994).

Individual innovative behavior includes a cognitive process by which novel ideas are developed, as well as a behavioral process by which novel ideas are suggested and adopted (Bindl et al. 2012; Madrid et al. 2014). Creativity refers predominantly to idea generation (Shalley et al. 2004), and is viewed as the first stage of innovation process (Kanter 1988; Janssen 2000). Therefore, individual innovative behavior includes creativity but is broader than it (Janssen 2000). In addition, individual innovative behavior involves employees' concentration on and investment of substantial effort in their work. It is also important to be creative and achievement oriented, yet tolerant of ambiguity and willing to take risks to be innovative (Jones et al. 1995). Hence, in addition to knowledge, skills, and abilities (KSAs), motivation is argued to have an effect on individual innovative behavior (Amabile 1988).

Organizations that support innovation develop and maintain climate where members feel secure and free to experiment with new ideas, and where diversity of thought and opinion is valued (Daft and Becker 1978). Thus, an innovative climate encourages employees to engage in innovative activities. Further, employees working in innovative environment are more willing to take risk and encouraged to think freely and exchange their opinions and ideas openly. It follows that the perception of an innovative climate is more likely to exert innovative behavior in the work.

Previous studies (Hunter et al. 2007; Hsu and Fan 2010) have consistently indicated that support for innovation in an organization facilitates an employee's innovative behavior. More specifically, Oldham and Cummings (1996) found a significant correlation between supportive supervision and the number of patent disclosures employees wrote over a 2-year period. Frese et al. (1999) provided evidence to support the positive relationship between supervisor support and making suggestions in companies. Zhou and George (2001) found that coworker support made a significant contribution to employee creativity. Similarly, Madjar et al. (2002) reported that the more employees received support for creativity from supervisors and coworkers, the better creative performance was. These empirical results show that an organization's climate to be conducive to innovative behavior.

Hypothesis 1 Organizational innovative climate is positively associated with individual innovative behavior.

2.2 PO-O and individual innovative behavior

Ownership is a prime motivator of human behavior. Pierce et al. (1991) first introduced the concept of PO which is defined as the state where "individuals feel as though the target of ownership (material or immaterial in nature) or a piece of it is 'theirs' (i.e., 'It is MINE!')" (Pierce et al. 2001, p. 299). PO is associated with pride and felt responsibility, which motivates the individual to engage in behavior beyond the formal job requirements (van Dyne and Pierce 2004). Feelings of ownership can be developed toward tangible or intangible targets in the organizational context, such as, a novel idea, a specific project, or the organization. Moreover, Avey et al. (2009) showed that "the organization would potentially be a more important target

of psychological ownership". This study focuses on individuals' feelings of ownership toward their organization (PO-O). And these feelings of possession or ownership create a bond between the individual and their organization (Belk1988; Dittmar 1992), and they have become psychologically tied to their organization (Pierce et al. 2004; Pierce and Jussila 2011). PO-O is one reason for employees to be motivated to engage in innovative behavior.

The effects of PO-O on individual innovative behavior can be explained at least by two self-regulatory motivational mechanisms, that is, self-consistency and self-enhancement. In the light of the self-consistency theory, "all other things being equal, individuals will engage in and find satisfying those behavioral roles which maximize their sense of cognitive balance or consistency" (Korman 1976, p. 5). For instance, people with high self-esteem will be motivated to keep their self-images as competent and capable individuals. Hence, they will be motivated to engage in competence demonstrating performance behaviors to achieve consistent cognitions.

On the basis of self-enhancement theory (Epstein 1973; Jones1973; Shrauger 1975), which not only makes many of the same predictions as self-consistency theory but also is somewhat different from self-consistent theory, people are motivated to improve their self-concept. "Likelihood of success" (Korman 2001) plays a critical part for individuals low in self-esteem. Specifically, only, when the possibility of success in improving self-esteem is high, a low self-esteem individual will take action to improve it. Contrarily, he tends to achieve outcomes that are consistent with his self-concept when the possibility of success in improving self-esteem is low, because he doesn't view himself as a competent, need-satisfying individual.

The organization has become a considerable part of themselves, so individuals with high PO-O will be motivated to engage in behaviors to nurture, advance, and protect the organization, including individual innovative behavior. They feel proud of their organization and devote more effort to maintain and enhance their consistent self-images as competent and capable individuals (Korman 1976). Moreover, PO-O is associated with a sense of responsibility (Van Dyne and Pierce 2004). The sense of responsibility that accompanies PO-O is more likely to lead to high performance and innovative behavior. Pierce and Jussila (2011) had examined the relationship between feelings of ownership toward the target and intrinsically motivated, target-directed behavior to maintain self-consistency and self-enhancement.

PO-O may also have a negative impact on innovative behavior, including resistance to change and reluctance to share ideas and adopt suggestions (Baer and Brown 2012; Olckers and du Plessis 2012). If PO-O is motivated by maintenance as opposed to enhancement of the self, higher PO-O is likely to be associated with lower level of innovative behavior. Baer and Brown (2012) investigated how people with varying level of PO respond to change. Their findings demonstrate that feeling of psychological ownership of ideas propels people to resist other's suggestions for change. Given the potential gains and losses associated with PO-O, we believe that its positive effects will outperform the possible negative effects. Research findings from Vandewalle et al. (1995) as well as Van Dyne and Pierce (2004) revealed that PO-O was superior to satisfaction in predicting extra-role behavior such as

innovative behavior, and PO-O showed a stronger relation with extra-role behavior than in-role behavior. PO-O makes a difference. Hence, PO-O is more likely to have a positive relationship with performance and innovative behavior.

Based on the self-consistency and/or self-enhancement theory, we argue that, for high PO-O individuals, the motivation to engage in innovative behavior develops from self-consistency and/or self-enhancement motivation partly. Therefore, we propose the following:

Hypothesis 2 Psychological ownership for the organization is positively associated with individual innovative behavior.

2.3 The moderating role of PO-O in the climate–innovation relationship

Psychological ownership is associated with pride that motivates organization members to perform at high levels. The sense of responsibility and obligation incurred by the feeling of ownership facilitates employees to engage in innovative behavior in the workplace. Further, for employees who perceive a high level of PO-O, organizational innovative climate will lead to more individual innovative behavior, because they view the organization as a significant part of the sense of self, and get motivation to exhibit more innovative behavior to maintain or enhance the self-concept as a worthy and need-satisfying individual (Korman 1976). In contrast, for employees who perceive a low level of PO-O, organizational innovation climate will be less strongly related to individual innovative behavior. This is because those employees are less likely to view the organization as a considerable part of the sense of self, and thus they are less adequately motivated to exhibit innovative behavior for maintaining or enhancing the self-concept. PO-O instills a sense of pride, responsibility and obligation in employees and acts as a motivator on the relationship between organizational climate and individual innovative behavior. Empirical evidence can be found in Chen's (2010) study in Taiwan. The result showed that PO could raise the engineers' knowledge sharing willingness and moderate the relationship between degree centrality of internal advice network and knowledge sharing. Based on the self-consistency and/or self-enhancement theory, the organizational climate–innovative behavior link depends on employees' developing a sense of PO-O, such that the relationship is stronger with high PO-O and weaker with low PO-O.

Hypothesis 3 Psychological ownership for the organization moderates the relationship between organizational innovative climate and individual innovative behavior such that the relationship is stronger when psychological ownership for the organization is high than when it is low.

2.4 PE and individual innovative behavior

PE is a motivational construct originating in an employee's perception of having a choice in initiating and regulating actions, having the ability to perform the job well (self-efficacy), being able to have an impact, and meaningfulness of the job (Spreitzer 1995). PE may have important influence on individual innovative

behavior. A central intention of empowerment is to enhance employees' capacities to engage in change-oriented activities and involves the creation of something new or different in their work roles, work units, or organization (Randolph 1995). PE as an intrinsic task motivation promotes individual innovative behavior. Further, PE involves an active orientation toward one's work (Spreitzer 2008), and contributes to elements which may facilitate innovative behavior, such as persistence of effort and resilience in face of unusual contexts and difficulties (Bandura 1977), initiative and flexibility (Thomas and Velthouse 1990), resourcefulness (Aryee et al. 2011), proactive behavior and acting independently (Spreitzer 1995). Even more specifically, psychologically empowered employees perceive their work is meaningful and personally important, and thus they may be more inclined to work hard to grasp a task from diverse perspectives, try to find a solving method by exploiting various information from diverse routes, and engendering plenty of alternatives by linking diverse routes of various information (Gilson and Shalley 2004; Jabri 1991). Psychologically empowered employees believe themselves have the ability to perform a task successfully, hence, they are more likely to implement their ideas and suggestions for change (Seibert et al. 2011), and they may become more innovative in their work and to expect success (Redmond et al. 1993). Psychologically empowered employees believe themselves have self-determination over job execution in some degree, and influence on their jobs and work environments in meaningful ways, thence, they are more likely to feel less restrained in face of kinds of routines than others and be innovative (Amabile 1988). Previous empirical work (Zhang and Bartol 2010; Seibert et al. 2011) has provided evidence to support the positive relationship between PE and individual innovative behavior.

Hypothesis 4 Psychological empowerment is positively associated with individual innovative behavior.

2.5 The moderating role of PE in the climate–innovation relationship

PE can be viewed as a motivating mechanism. According to Pieterse et al. (2010), willingness and competence are both important to promote individual innovative behavior. Organizational innovative climate can increase employees' willingness to be innovative and behave innovatively. Krause (2004) revealed a positive effect on innovative behavior when managers are granted autonomy and freedom. PE can make them feel able to be innovative and behave innovatively. We posit that for employees who perceive a high level of PE, organizational innovation climate will lead to more individual innovative behavior, because psychologically empowered individuals perceive themselves as competent and able to influence their jobs and work outcomes in meaningful ways (Pieterse et al. 2010), facilitating persistence of effort and resilience (Bandura 1977), showing initiative and flexibility (Thomas and Velthouse 1990), leading to proactive behavior and acting independently (Spreitzer 1995), and promoting resourcefulness (Aryee et al. 2011). Thus, organizational innovative climate allows employees high in PE to actually make use of the possibility to take initiative. This results in more innovative behavior on the part of these employees. In contrast, for employees who perceive a low level of PE,

organizational innovation climate is less strongly related to individual innovative behavior. Employees with low PE are less effective, because they do not believe they have the possibility to take initiative. They become demotivated, which hinder innovative behavior (demotivating causing less innovative behavior). As such, the strength of this relationship depends on the level of PE. Organizational climate is more effective in engendering individual innovative behavior under the conditions of high PE than under condition of low PE. Therefore, the preceding discussion leads us to hypothesize the following:

Hypothesis 5 Psychological empowerment moderates the relationship between organizational innovative climate and individual innovative behavior in such a way that the relationship is more positive when psychological empowerment is high than when it is low.

3 Methods

3.1 Sampling procedures and participants

We tested the proposed theoretical framework using data from multiple sources, such as questionnaire survey, interviews and documentations, to ensure the accuracy and cross-validate the research findings. The present study surveyed employees in enterprises across various industries in Guangdong province in China. In order to encourage enterprises to participate in the survey, we conducted face-to-face interviews, follow-up calls, and e-mail communications in each firm to explain the data collection procedure. A representative was in charge of distributing and collecting questionnaires from employees in each firm. The sample was randomly chosen from different work units, job levels, gender, age groups, and education levels. A cover letter attached to each questionnaire explained the objective of the survey and assured respondents of the confidentiality of their responses and the voluntary nature of participation in the survey. The employees completed the questionnaires during breaks at work or at home and returned them in a sealed envelope to the representative in each firm. Then the representative in each firm returned the completed surveys separately to one of the authors.

Employees provided individual-level information about their gender, age, education, and occupation, and their own level of organizational innovative climate, PO-O, PE, and innovative behavior, and managers provided firm-level information about firm characteristics, such as firm age and size. Questionnaires were distributed to 1200 employees in 200 firms in total. We had a final usable sample with complete matched firm-employee information for 804 employees from 157 firms. The response rate for firms and for employees is 78.5 and 67.0% respectively. The number of employees within each firm is from 1 to 15. The sample characteristics are as given in Table 1. In addition, the 157 firms are across various industries, include manufacturing (61.8%), agriculture, forestry and fishing (15.9%), wholesale trade and retail trade (8.9%), construction (3.8%), information

Table 1 Means, standard deviations, correlations, and Cronbach's alpha of the study variables

Variables	M	SD	1	2	3	4	5	6	7	8
	Individual-level employee variables ($N = 804$)									
1. Employee gender[a]	.41	.49	–							
2. Employee age	32.65	7.29	− .34**	–						
3. Employee education	3.68	1.35	.03	− .00	–					
4. Employee occupation	1.78	.91	− .03	.06	− .01	–				
5. Organizational innovative climate	3.77	.59	.03	.03	.17**	.03	0.93			
6. Psychological ownership for the organization	3.44	.59	.08*	.02	.12**	− .00	.55**	0.74		
7. Psychological empowerment	3.71	.55	.01	.07*	.12**	.02	.62**	.52**	0.91	
8. Individual innovative behavior	3.74	.64	− .02	.05	.12**	.02	.71**	.54**	.64**	0.90
	Firm-level variables ($N = 157$)									
1. Firm age	13.46	5.30	–							
2. Firm size[b]	4.61	1.35	.196*							

Numbers 1–8 in the top row correspond to the variables in the respective sections of the table. Coefficient alpha values are reported in italics along the diagonal

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

[a]Female = 1; male = 0

[b]Firm size was measured by number of employees using natural logarithm

transmission, software and information technology services (3.2%), culture, sports and entertainment (3.2%), finance (2.5%), accommodation and food service (0.6%).

3.2 Measures

Organizational innovative climate. We assessed organizational innovative climate by adapting 12 items from Liu and Shi (2009) which are based on Amabile et al.'s (1996) KEYS (Assessing the Climate for Creativity). Support for innovation includes coworker support, supervisory support, and organizational support. Sample items include "People are encouraged to solve problems creatively in this organization", "A supervisor who serves as a good work model, sets goals appropriately, supports the work group, values individual contributions and shows confidence in the work group", and "There is free and open communication within my work group". This scale was measured on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The Cronbach's alpha for the organizational Innovative climate scale was 0.93.

Psychological ownership for the organization. PO-O was assessed using a 7-item scale from Van Dyne and Pierce (2004) on a 5-point Likert scale, ranging from 1

(strongly disagree) to 5 (strongly agree). A sample item is, "This is my organization". The Cronbach's alpha was 0.74.

Psychological empowerment. We measured PE using a 12-item scale developed by Spreitzer (1995). The scale is composed of four three-item subscales measuring meaning (e.g., "The work I do is meaningful to me"), competence (e.g., "I am confident about my ability to do my job"), self-determination (e.g., "I have significant autonomy in determining how I do my job"), and impact (e.g., "My impact on what happens in my department is large"). Response options ranged from 1, "strongly disagree", to 5, "strongly agree". The Cronbach's alpha for the psychological empowerment scale in this study was 0.91.

Individual innovative behavior. We adopted a 6-item scale from Scott and Bruce (1994) to measure individual innovative behavior. Sample item is "I always search out new technologies, processes, techniques, and/or product ideas". Respondents indicate the extent to which they agree or disagree with a series of statements on a 5-point Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree). The Cronbach's alpha for the individual innovative behavior scale was 0.90.

Individual-level control variables. Gender (for example, Van Dyne and Pierce 2004; Wang and Lee 2009; Aryee et al. 2011), age (for example, Van Dyne and Pierce 2004; Aryee et al. 2011), education (for example, Van Dyne and Pierce 2004; Pieterse et al. 2010), and occupation were used were incorporated as control variables to make sure the findings hold irrespective of these individual attribute variables. Gender (0 = male, 1 = female) was dichotomous variables, age was measured in years, education was measured using five order categories, and occupation was measured using four order categories in the present study.

Firm-level control variables. We controlled for the firm's age and size at the firm level. Firm age was measured by years since establishment, and firm size was measured by number of employees using natural logarithm.

3.3 Data analyses

In this study, employees were nested in firms. Employee gender, age, education, occupation, organizational innovative climate, PO-O, PE, and individual innovative behavior, are conceptualized at the individual employee level of analysis; and firm characteristics, such as firm age and size, are conceptualized at the firm-level of analysis. Thus, we applied two-level hierarchical linear modeling (HLM; Bryk and Raudenbush 1992) to test all the Hypotheses.

4 Results

Table 1 displays means, standard deviations, correlations, and reliabilities among all variables.

Besides the reasonably high alpha coefficient, we conducted a confirmatory factor analysis (CFA) to examine the factorial structure of our measures of organizational innovative climate, PO-O, PE, and individual innovative behavior at the individual level of analysis. Results showed that a four-factor structure fit the

data well, [χ^2 (589, N = 804) = 2736.79, $p < .001$, RMSEA = .067, NFI = .97, CFI = .98, GFI = .84]. All factor loadings were significant at $p < .05$, with t-values ranging from 8.48 to 27.78. The CFA results indicated that factor loadings of the scales items were statistically significant ($t > 2.0$). The measures showed sufficiently high reliability and good validity for research purpose.

We first examined the degree of between-group variance in individual innovative behavior when conducting our HLM analyses. Results of null model revealed that 23.36% of the variance in individual innovative behavior reside between firms and provided evidence of significant between-group variance in individual innovative behavior ($\gamma_{00} = 3.74$, df = 156, $\chi^2 = 735.98$, $p < .001$), and thus justified further cross-level analyses.

Next, we controlled for employee gender, age, education, and occupation as Level 1 effects and firm age and size as Level 2 effects. All control variables had no statistically significant influences on individual innovative behavior as indicated in Table 2, Model 1.

Then, we centered the predictor and the moderator variables to reduce possible multicollinearity at the individual level before testing our Hypotheses. Hypotheses 1, 2, and 4 predicted that organizational innovative climate (H1), PO-O (H2), and PE (H3), respectively, would positively influence individual innovative behavior.

Table 2 Hierarchical linear modeling results predicting individual innovative behavior

Level and variable	Model 1	Model 2	Model 3	Model 4	Model 5
Intercept	3.56***	3.61***	3.68***	3.68***	3.69***
Level 1: individual level					
Employee gender	− 0.01	− 0.04	− 0.04	− 0.04	− 0.04
Employee age	− 0.00	0.00	− 0.00	− 0.00	− 0.00
Employee education	0.06	0.04	0.04	0.03	0.03
Employee occupation	− 0.00	− 0.00	− 0.00	− 0.01	− 0.01
Organizational innovative climate				0.26***	0.26***
Psychological ownership for the organization		0.37***	0.15***	0.08*	0.08*
Psychological empowerment			0.22***	0.14***	0.14***
Psychological ownership for the organization × organizational innovative climate					− 0.03
Psychological empowerment × organizational innovative climate					0.05*
Level 2: firm level					
Firm age	− 0.01	− 0.01	− 0.01	− 0.01	− 0.01
Firm size	0.02	0.03	0.02	0.03	0.03
Deviance	1372	1133	1171	1074	1076

For Level 1, N = 804; for Level 2, N = 157. In all models, all variables except for employee gender, age, education, and occupation were group-mean centered. Entries corresponding to the predicting variables are estimations of the fixed effects (γ values) with robust standard errors

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

Organizational innovative climate ($\beta = 0.37$, $p < .001$), PO-O ($\beta = 0.15$, $p < .001$), and PE ($\beta = 0.22$, $p < .001$), respectively, were significantly related to individual innovative behavior as indicated in Table 2, Models 2 and 3. Consistent with prior work (Scott and Bruce 1994; Pieterse et al. 2010), the relationship between PE and individual innovative behavior was confirmed. Hypotheses 1, 2, and 4 thus were supported.

Hypotheses 3 and 5 suggested that PO-O (H3) and PE (H5), respectively, would moderate the relationship between organizational innovative climate and individual innovative behavior. Thus, we created two interaction terms (organizational innovative climate × PO-O and organizational innovative climate × PE) and entered them into the regression equation in Model 4 of Table 2. The interaction between organizational innovative climate and PO-O was not significantly related to individual innovative behavior ($\beta = -.03$, n.s.). Hypothesis 3 thus was not supported. As predicted, we found moderation by PE on the relationship between organizational innovative climate and individual innovative behavior ($\beta = .05$, $p < .05$). The interaction chart indicates that the relationship between organizational innovative climate and individual innovative behavior is stronger for individuals with high PE than for individuals with low PE (see Fig. 2). Therefore, Hypothesis 5 was supported.

We further checked for multicollinearity among individual-level variables by calculating the variance inflation factors (VIF) within the range from 1.5 to 1.9, well below the threshold of 10 (Neter et al. 1985). Multi-collinearity was not a serious problem in the present study.

5 Discussion and conclusion

The empirical evidence of the relationship of organizational climate and innovative behavior is ambivalent (Hunter et al. 2007), indicating that such a relationship is subject to boundary conditions. In response to the call for an exploration of

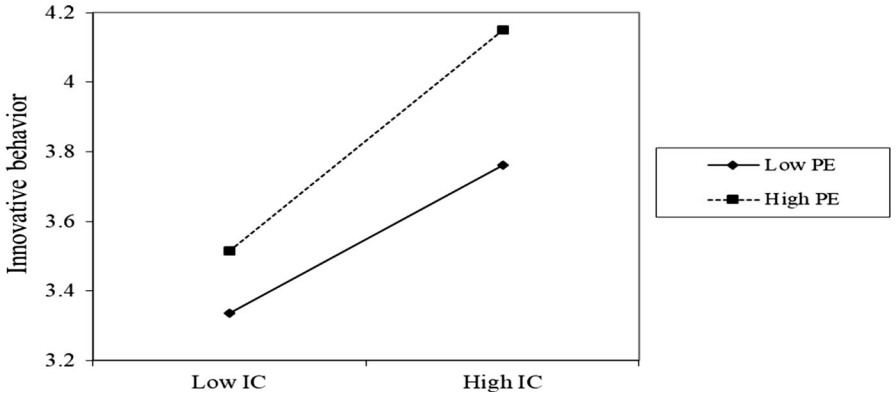

Fig. 2 The interaction between psychological empowerment and organizational innovative climate on individual innovative behavior

psychological predictors as antecedents of individuals' innovation and as moderators of the climate–innovation relationship (Yuan and Woodman 2010), this study focused on the direct and indirect effect of PO-O and PE in the climate–innovation relationship. Based on a sample of 804 employees from 157 firms in China, the results of this study provide support for the positive and significant influences of organizational innovative climate, PO-O, and PE on individual innovative behavior. PE was further found to moderate the relationship between organizational innovative climate and individual innovative behavior in such a way that the relationship was more positive when PE was high than when it was low as expected. However, we did not find PO-O to have a moderating effect on the relationship between organizational innovative climate and individual innovative behavior.

5.1 Theoretical implications

The findings of this study have two noteworthy theoretical implications. First, this study takes an initial step toward examining the relationship of PO-O and individual innovative behavior. In line with our expectations, PO-O displayed a direct and positive relationship with individual innovative behavior by intertwining the self with the organization, and thus being motivated to maintain or enhance the self-concept as a worthy and need-satisfying individual. As mentioned above, nevertheless, PO within organizational contexts has not always been explored in empirical research (O'Driscoll et al. 2006). This finding could contribute to not only the individual innovative behavior literature through examining its determinants, but also the PO literature through examining its consequences.

In addition, by identifying psychological predictors as moderator of the effect of organizational innovative climate on individual innovative behavior, our results emphasize that how one feels and reacts in the same innovative climate conditions depends on his or her psychological states. Theoretically, results of our study indicated that organizational innovative climate was likely to have a stronger impact on individual innovative behavior for individuals with high PE. This finding is consistent with previous studies that highlighted the moderating role of PE in the relationship of context factors and individual innovative behavior, for example, transformational and transactional leadership (Pieterse et al. 2010). Thus, our research complements and extends prior work by theorizing and testing the moderating influences of PE on the process through which climate influence innovative behavior. However, we did not find that PO-O interacts with organizational innovative climate—the "can do" motivation—to predict innovative behavior. This may be because a high level of PO-O may also cause people to feel a need to protect the organization, thus they are inclined to resist change, and are less likely to share ideas, adopt suggestions, and then engage in innovative behavior (Seibert et al. 2011). Recent studies also reveal the negative side of PO (Baer and Brown 2012; Olckers and du Plessis 2012). In line of this reasoning, there are also potentially detrimental effects of psychological empowerment. A high level of empowerment, with a strong desire to shape employees' work contexts, may cause strain in the work relationship, serving as a threat to their supervisors. When highly empowered employees perceive mistreatment, they are more motivated to engage in

deviant or dysfunctional discretionary behaviors as a means to reaffirm their impact over the work environment (Mackey et al. 2015). Our study responds to several scholars' calling for the importance of allocating greater research attention to the moderating variables in the relationship between climate and innovative achievements (Anderson et al. 2004; Hunter et al. 2007), as well as the consideration of both personal and contextual factors to stimulating innovation in work organizations (e.g., Oldham and Cummings 1996).

5.2 Practical implications

The results of our study have several important practical implications. Results from this study offer guidance to practitioners or executives who want to stimulate their subordinates' innovative behavior. Managers should keep in mind that organizational innovative climate could not simply engender individual innovative behavior, PO-O and PE should also be taken into account. They can stimulate a high level of employee innovative behavior by enhancing employee psychological empowerment and regulating employee PO-O. Given that PE magnifies the effect that organizational innovative climate has on individual innovative behavior, managers should also pay attention to and find ways to enhance the level of PE. Managers should help employees feel the importance and meaningful roles in contributing to the overall effectiveness of the organization, express confidence in their competence, provide then with autonomy, and encourage them to decide how to carry out their jobs.

Given that high PO-O may weaken the effect that organizational innovative climate has on individual innovative behavior, managers should not only highlight the need to acknowledge and manage the dark side of the high level of PO-O, but also find ways to keep the high PO-O individuals from resisting to change or being reluctant to engage in innovation. In addition, they need to note that such an innovative behavior should be self-initiated rather than imposed by the organization.

5.3 Limitations and future research

The vast majority of studies have their limitations, and the present study is no exception. First, we have not distinguished between personal feelings of shared ownership and personal feelings of individual ownership. Pierce and Jussila (2010) have recently proposed that psychological ownership can exist as an individual-level as well as a group-level phenomenon, and further introduced the construct collective psychological ownership, which is defined as the collectively held sense (feeling) among group members that a target of ownership (or a piece of that target) belongs to the whole group. Future study should explore the underlying processes linking individual psychological ownership and collective psychological ownership to individual innovative behavior, and their roles in the organizational climate–innovative behavior link respectively.

Second, we focused on the bright-side of PO-O. However, it should be noted that there may be also a negative relationship between PO-O and innovative behavior, such as resist to change or sharing of innovative ideas, as well as deviant behavior. Specifically, if PO of an employee to a particular organizational target is motivated

by maintenance as opposed to enhancement of the self, higher PO for these targets is likely to be associated with lower level of innovative behavior. Indeed, Avey et al. (2009) had further developed two forms of psychological ownership: promotion and prevention. We strongly recommend future studies to further explore the promotion and prevention effect of PO on performance and innovative behavior.

Third, our study adopted a cross-sectional design. Thus, it is hard to allow any judgment of causality, and fully capture the dynamic nature of the relationship between organizational innovative climate and individual innovative behavior. Future research should use longitudinal data to more clearly establish the relationship among organizational innovative climate, PO-O, PE, and individual innovative behavior.

Fourth, the present study collected the individual-level data from participants themselves, increasing the threat of common method bias. Constructs including PO-O and PE address individuals' internal states, thus it may make sense to collect the individual-level data by using self-reported measures. Janssen (2000) showed that self-report ratings of innovation-related behavior are consistent with supervisor scores of innovative performance. Conway and Lance (2010) justified the use of self-reports because employee themselves are the most qualified individuals to evaluate and report their innovative behavior. Furthermore, the results from Harman's one-factor (Podsakoff and Organ 1986) indicated that six factors with eigenvalues greater than one emerged, and the largest factor did not account for the majority of the variance. In addition, common method bias has been considered to be less of an issue in the moderated regression (Lance et al. 2010; Spector and Brannick 2010; Convey and Lance 2010). Given that we tested a moderated path analysis model, the concerns about common method variance were minimalized. Common method bias could not have significantly affected our findings. However, given that it is quite common to treat the climate variable as "perceived" climate in the literature (e.g., Liu et al. 2016), we conceptualized organizational innovative climate as individual perception of the organizational innovation orientation that can strongly vary across individuals within a unit at the individual level of analysis, although it can also be conceptualized as individuals' shared perceptions of organizational events, practices, and procedures at the organizational or the unit level of analysis (e.g., Patterson et al. 2005). Additionally, our measure of individual innovative behavior may be exaggerated as a result of self-enhancement bias, thus the rating of individual innovative behavior should be collected from managers in future study. Hence, future study using data from multiple sources at multi-stage would add to our confidence in our findings.

Finally, we need to mention that our model, developed from Western theories, was tested in the Chinese context. Although the conceptual arguments used to propose the hypotheses are not culturally bound, it would be interesting, for instance, to identify the moderating roles of PO-O and PE in the relationship between organizational innovative climate and individual innovative behavior in different cultural contexts. Consequently, it is valuable for future study to be conducted in other cultures and further verify the generalizability of these findings.

6 Conclusion

In conclusion, despite its limitations, this study indicates that PO-O and PE are two important determinants of individual innovative behavior. More importantly, it takes an important step towards a clearer understanding of the climate–innovation linkage by identifying PE as an important boundary condition. Although we have made a great effort, it is still essential to know more about other personal and context factors that might moderate the climate–innovation linkage. Due to the significance of innovation to most organizations, similar studies still have considerable practical implications.

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