

Organizational Commitment and Creativity: the Influence of Thinking Styles*

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Creativity has long been a popular research question among psychologists. Studies in the past few decades have explored the effect of both internal individual factors and external environmental factors on creativity. The findings help shed light on how we can cultivate and further tap creativity. With the increasing role of culture in the study of psychology in the recent decade, researchers have now begun to turn their attention to the study of how culture can influence creativity. Answering this question in a scientific way is of profound significance to the ongoing educational reform in China. Based on the unique thinking style of Chinese people and focusing on knowledge workers engaged in creative activities, our study explored the relationships among thinking style, organizational commitment and creativity of Chinese employees. We theorized that the thinking style of connection and change would influence employee creativity both directly and indirectly. Data analysis from a sample of 134 Chinese subordinates supported our hypothesis, indicating that connection was correlated positively to creativity, whereas change was correlated negatively. Furthermore, connection was found to have a moderating effect on the relationship between organizational commitment and creativity; and the influence of change on employee creativity was partially mediated by organizational commitment. Our findings are of great theoretical and practical significance for understanding the mechanisms the effect of thinking style.

Key Words: Thinking style; Organizational commitment; Creativity; Culture.

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1. INTRODUCTION

In today's society, the rise of a knowledge-based economy is attributed to the increasing importance of employee creativity, one of the most important intangible assets of a company, for its sustainable competitive advantage

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(Petty and Guthrie, 2000; Chen et al., 2004; Majid, 2011). According to Gifford Pinchot III (1985), an innovation consultant, the age of innovation comes at the same time as the age of information. Much as we are in possession of new information, challenges exist not only in creation, storage, and procurement of information, but also, and probably more, in applying new information to new problems, which often plays a determinant role for companies to succeed in such new forms of competition (Pinchot, 1985). We have seen a wide range of studies on creativity carried out by scholars in management, psychology, economics and education. There is a large amount of empirical and theoretical evidence (e.g. Cummings and Oldham, 1997; Hughes, 2003; Shalley and Gilson, 2004; Chen and Kaufman, 2008; Zientara, 2009; Peng, 2009; Yin, 2008; Zhang and Xu, 2011) showing that creativity is an important benchmark in measuring core competitiveness of a modern organization. Imagination and innovation will gradually replace human labor and become the major source of value creation, which is also an intangible core competitive advantage of a company. Management of all kinds of organizations is interested in learning about factors that can affect the creativity of their employees and seeking new drivers for continuous innovation (Gumusluoglua and Ilsev, 2009; Shalley, Gilson and Blum, 2009; Tu, 2009). The goal is to enhance the potential for individual employees to better serve the overall target of the organization, and furthermore to improve the performance and competitiveness of the organization as a whole.

Among those factors that affect an individual's creativity, thinking and cognitive styles of an individual have been emphasized by researchers in many fields (Ranco and Chand, 1995; Haller and Courvoisier, 2010; Peng, 2010). Thinking and cognitive styles reflect the characteristics of the way people think and process information, which obviously is closely related to creative thinking. Interestingly, there are few studies dedicated to analyzing the relationship between holistic thinking style and individual creativity, compared with the amount of research on how specific cognitive processes, such as problem-solving and decision-making, affect creativity (Reiter-Palmon et al., 2009). As a matter of fact, thinking style, a mode of meta-cognition, reflects the cognitive framework in which information is processed and the world is perceived. Therefore, creativity depends not only on thinking style itself, but also on the individual's attitude towards the organizational environment (e.g. organizational commitment), which is largely determined by thinking style.

This paper aims to empirically explore the relationship between employees' thinking styles and their creativity. We argue that introducing the variable of employee thinking style is important at at least two levels: at a micro and individual level, this study distinguishes the factors that are beneficial or detrimental to employee creativity as a result of individual

thinking style. Furthermore, it attempts to investigate the relationships among different components of thinking style, employee organizational commitment, and employee creativity. At a macro and cultural level, since thinking style reflects the social and cultural influence on mentality, this study puts emphasis on connection and change, two characteristics of Chinese mentality, based on which we then look at the opportunities and challenges faced by employees in Chinese organizations under the current trend of technological innovation.

2. THEORY AND HYPOTHESES

2.1. Employee creativity and thinking style

Employee creativity is defined as the production of original and useful ideas concerning products, services, processes and procedures (Zhou and Shalley, 2003). Ideas are considered novel if they are unique relative to other ideas currently available in the organization. Ideas are considered useful if they have the potential for direct or indirect value to the organization, in either the short- or long-term. Given this definition, creativity could range from suggestions for incremental adaptations in procedures to radical, major breakthroughs in the development of new products (Shalley, Zhou and Oldham, 2004).

Thinking style refers to the preferred ways of processing information when people think. It shows people's specific cognitive style on thinking, analyzing or problem solving (Sternberg, 1997), which are also aspects relating closely to one's creativity (Ranco and Chand, 1995). Although plenty of studies have explored the effects of individual variables, such as personality, motivation and self-efficiency, on employee creativity (Ivcevic, 2009; Silvia, Kaufman, and Pretz, 2009; Haller and Courvoisier, 2010; Baer, 2010; Cheng and Kim, 2010), little research focuses on thinking and cognitive styles. Discussions about general creativity, without an organizational context, pay more attention to the mode of thinking, which can be summed up into two kinds. The first one was concerned with the relationship between creativity and a holistic mode of thinking and suggested the latter being a positive predictor of the former (e.g. Harnad, 1972; Tan-Willman, 1981; Okabayashi and Torrance, 1984; Kim and Michael, 1995); The second one explored field-dependence on the impact of creativity, and demonstrated that individuals with a field-dependent cognitive style may be less skilled at the task of cognitive restructuring, and therefore show worse creative performance than field-independent ones (e.g. Miller, 2007; Wang and Zhou, 2006; Liu, 2008). However, both kinds of studies mentioned above aimed at investigating relationships between individual creativity and the single aspect view of thinking and cognitive styles, and ignored a macro-view of thinking style with multi-aspects. Zhang (2002a; 2002b) was the first

researcher who comprehensively inspected the relationship between thinking style and individual creativity. By testing American college students' thinking style using the Thinking Style Inventory developed by Sternberg and Wagner (1992), she found creative thinking is positively related to thinking styles of Legislative, Judicial, Global and Liberal. In Sternberg and Wagner's interpretations (1992), individuals with these thinking styles always process information and solve problems from the vantage point of the overall picture beyond existing rules and procedures.

However, as it is emphasized by Sternberg (1997), thinking style is not static, but a covariant variable of environmental change. In Wu and Zhang's (1999) assessment that utilized the Thinking Style Inventory, some structural differences were detected between thinking styles of Chinese and American college students, suggesting the exploration of Chinese thinking style in a Chinese specific cultural and social context. Studies in cultural psychology also found that the characteristics of both thinking and cognitive processes are closely tied to culture (Hou and Zhu, 2002; Morris and Peng, 1994; Nisbett and Masuda, 2003). Thus, when considering the cultural issues, researchers must be cautious of making direct inferences from western studies of Chinese samples.

To better explain thinking style and its effects on individual's behavior in Chinese society, a multi-dimensional approach of Chinese thinking style was developed by Hou, Zhu and Peng (2003; 2004). Based on a systematic review of former studies and classical theories of comparisons between Western and Chinese cultures, an initial structure of Chinese thinking style was developed with five principles: connection, harmony, change, contradiction and compromise. A Chinese thinking style scale was formed following this structure. Based on results of applying this scale in various Chinese samples, the five principles mentioned above then converged into three main factors, which constituted the final version of the Chinese Thinking Style Scale (CTSS). Among the three factors, change indicates the individual's stability and consistency in self-concept, and reflects the constant awareness that the world is changing forever and there is no eternal right or wrong. Contradiction is defined as the belief that everything has two sides that are mutually inconsistent. For connection, Chinese people believe that things are generally linked to each other and that nothing can exist without connections to other things. A series of studies (e.g. Hou and Zhu, 2002; Hou, Gan and Zhang, 2003; Hou, Zhu and Peng, 2003; 2004; Hou, Zhang and Wang 2007; Lu, 2008) have shown that the CTSS is a valid measurement tool in not only assessing Chinese cognitive tendency when thinking about or analyzing something, but also detecting the influence of thinking style as a meta-cognitive characteristic on social cognition, decision-making, attribution and so forth of Chinese people.

In this study, two main factors of Chinese thinking style, connection and change, were placed into an organizational context in order to explore their influence on Chinese employee creativity. On one hand, former studies have indicated a positive relationship between the holistic mode of thinking and individual's creativity (Zhang, 2002a), and suggested that individuals integrate different information from a comprehensive perspective following the holistic mode of thinking. Thus, it is possible that some overlaps can be found between holistic thinking and connection, given the fact that both concepts emphasize interdependent relations among different things or different parts of the same thing, which implies that connection may have influence on individual creativity. Furthermore, since connection reflects one's tendency to detect and build links from one thing to another, individuals with high connection may be more efficient in drawing inferences about other cases from one instance and weeding through the known to bring forth the new. On the other hand, Chinese people believe that everything is in change and that one should change himself to conform to environmental changes in order to make good decisions based on circumstances. As indicated by Hou, Zhu and Peng (2004), individuals with low change are more open to express ideas despite outside interferences; they always have more confidence of their own characteristics in dealing with problems. If this is the case, it should be clear that the qualities mentioned above relate closely to one's creativity. Therefore, the first hypothesis of this study is presented as follows:

H1 *Chinese employees' creativity can be predicted by their thinking style: connection will be positively related to employee creativity (H1a), whereas change will be negatively related (H1b).*

2.2. Organizational commitment and employee creativity: connection as a moderator

Organizational commitment is the employee's psychological attachment to the organization. In a general sense, it reflects one's load and expectation contingent upon organizational priorities and goals (Reichers, 1985; Henkin and Holliman, 2009; Johnson et al., 2010). Former studies have indicated organizational commitment to be a positive antecedent of varieties of organizational behavior: the higher the organizational commitment is, the better the job performance and the lower the turnover rate are (see Mathieu and Zajac, 1990; Meyer, et al., 2002, for a review). In today's post-industrial society, modern organizations emphasize in particular the influence of innovation on the long-term development of organizations, so employees with strong psychological attachment to organizations could show better creative performance due to their congruence to the organization's goal. In Swails' (2000) study, the relationship between organizational commitment and employee creativity was explored through both qualitative

and quantitative methods. During the interviews with some supervisors in technology-based organizations, the interviewees all illustrated that a committed person in their organizations is someone who is looking to innovate, create, and satisfy customer needs and is looking for ways of improving the business operations - these belong to the most important aspects of meeting an organization's goal, especially in knowledge-intensive companies. The positive influence of organizational commitment on employee-level creativity was also found by Cekmecelioglu and Gunduz (2006).

The relationship with organizational commitment and employee creativity, however, may be moderated by some additional organizational variables rather than fixed. Taking Zhou and Gorge's (2001) research for example, employees with high job satisfaction exhibited the highest creativity when commitment was high, but this effect was moderated by coworkers' feedback and support, suggesting the need to explore more deeply the influence of organizational commitment on employee creativity within specific organizational contexts.

In this study, we expect that an analysis of thinking style of Chinese employees will provide a new perspective for detecting the relationship between organizational commitment and employee creativity, and consequently, allowing supervisors in modern organizations to manage and train employees with better and more efficient techniques. As we have mentioned above, connection reflects the employee's ability to integrate information and explore relations among different things. Thus, employees with high connection should show better integration between individual-level creativity and organization's goals, and greater abilities to translate their commitment to the organization into creative performance which is beneficial to organizational development. On the contrary, employees with low connection may show creativity randomly due to their ignorance of the relationships between their own creative behavior and the organization's goals. As a result, our second hypothesis is stated as follows:

H2 *Connection will moderate the influence of organizational commitment on employee creativity. Employees with high organizational commitment will exhibit high creativity when connection is high. For employees with low connection, this relation will be ambiguous.*

2.3. Change and employee creativity: organizational commitment as a mediator

As discussed above, connection affects employee creativity in two ways: it directly affects problem analysis and problem solving processes; and it indirectly affects employee's perception of the organization (i.e. affects the relationship between organizational commitment and creativity). Similarly, change as a mode of meta-cognition can also affect creativity in two ways. In H1 we briefly analyzed how change can directly have an effect on

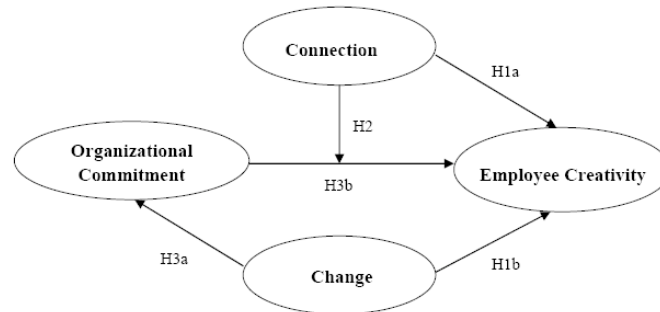
employee creativity; As for indirect effects, we expect change will affect creative performance through affecting an employee's level of organizational commitment.

Specifically, change reflects how employees view things including self-stability. A stronger sense of change means the world and other people are perceived to be more volatile, thus the organization will also be viewed as instable. Gan and Hou (2005) pointed out that a sense of change is negatively correlated with employee's attitude towards workplace relationships and working environment, and further results in low level of organizational commitment. This is because employees with high change will regard their workplace relationships and working environment to be only temporary and liable to change at any time. It is, therefore, difficult to have stable psychological connection and recognition with the organization because there may be dramatic changes to the status quo. In the context of the relationships between organizational commitment and creativity, we hypothesize that:

H3 *Change can affect employee creativity through organizational commitment. Higher change will result in lower organizational commitment (H3a) and lower creativity (H3b).*

Up to now, we have introduced three hypotheses to describe the relationships among thinking style, organizational commitment and creativity of Chinese employees. The figure below depicts how different variables are related in this study.

FIG. 1. Expected Relationship among Employee Thinking Style, Organizational Commitment and Creativity



3. METHOD

3.1. Participants

Employees from a large Chinese IT company participated in our research. Separate questionnaires were developed for subordinates and their immediate supervisors. Of the 155 pairs of questionnaires distributed, 134 subordinate questionnaires (a response rate of 86.5%) and 81 supervisory questionnaires (a response rate of 52.3%) were returned. In other words, a total of 81 supervisor-subordinate dyads and 53 subordinates without supervisory data remained available in our sample.

Among the 134 subordinates, 88 (65.7%) were male, 46 (34.3%) were female, 54 (40.3%) held college degrees, 80 (59.7%) reported higher levels of education such as Masters or Ph.D. The mean age for these employees was 30.75 ($SD = 3.8$). All participants had worked for more than 1 year in the current company, the mean tenures was 76.02 ($SD = 54.2\%$) months.

In order to confirm that all subordinates were engaged in some creative-related work, only employees from the R&D group and IT Service group were selected in our sample, with 60 (44.8%) and 74 (55.2%), respectively.

3.2. Measures

3.2.1. *Employee thinking style*

Employee thinking style was measured by items adapted from Hou's (2004) Chinese Holistic Thinking Style Scale (CHTSS). There were 4 items reflecting Chinese employees thinking style as "connection" ($\alpha = 0.75$), with an example item being "Different things are related to each other, though they appear to be isolated". The measurement of thinking style as "change" comprised another 5 items ($\alpha = 0.74$), with an example item being "Everybody has some central characteristics which can never be changed by time and environment". All the items were rated on a 7-point Likert scale.

3.2.2. *Employee creativity*

Different methods have been used in field studies on employee creativity. As suggested by Shalley, Zhou and Oldham (2004), field studies should include evaluations of employee creativity by multiple judges (e.g., coworkers, other supervisors, and self) in order to assess inter-rater reliability. In this study both self-report and supervisors-rated evaluations were collected as subjective measurements for the same employee. The objective numbers of invention disclosures were also reported by the subordinates to reflect their creativity.

A supervisor-rated employee creativity scale was adapted from Tierney, Farmer and Graen (1999). It included 4 items ($\alpha = 0.90$) which had proved to be effective in reflecting Chinese view of employee creativity (Farmer,

Tierney and Kate, 2003). An example item is "This employee often seeks new ideas and ways to solve problems."

Eight items from the originality subscale of the Kirton Adoption-Innovation Inventory (KAI; Kirton, 1976), which had been approved to be a valid assessment of employees own view of their creativity (see measures section of Farmer, Tierney and Kate, 2003, for a review), were used in the questionnaire of self-report creativity. An example item is "I often have fresh perspectives on old problems." Furthermore, based on interviews with employees in our sample, two new items were developed and added as supplement ("I take the risk of trying new methods" ; "I always keep curious to everything"). Subordinates were asked to evaluate how these 10 items gave proper descriptions for their behaviors in daily work ($\alpha = 0.86$). The total number of invention disclosures (i.e. patents and academic papers) was reported by each subordinate at the end of our survey, nonadjacent with the self-rated creativity questionnaire.

3.3. Employee organizational commitment

Meyer and Allen's (1993) organizational commitment scale was used here ($\alpha = 0.76$). 18 items were rated on a 7-point Likert scale, with an example item being "I really feel as if this organization's problems are my own". Series of studies by Chen and Francesco (2000; 2003) had confirmed this scale's application in Chinese settings.

The original version of each scale, such as the CHTSS, was created in English. Three bilingual researchers translated all the items into Chinese, then back into English, independently. After getting consistent among translations, an initial version of the whole questionnaire was sent to some in-service training postgraduates in Peking University as a pretest. Further revision was carried out according to the feedback of the pretest to derive a final version of all items.

3.4. Data analysis

In present study, we employed OLS regressions to examine the relationship between employee thinking style of connection and change, and employee creativity. To get a comprehensive measurement of creativity, data were collected from three different sources, which were self-report creativity, supervisor-rate creativity, and invention disclosure. However, despite being informed of the purpose of the study and the promised anonymity, many supervisors did not want to rate their subordinates' level of creativity, resulting in a response rate of only 52.3% for the supervisor-rate data. Furthermore, although creativity of employees in R & D department could

be measured in terms of papers and patents produced, using invention disclosure as index would be improper for employees in other department, such as IT service. Based on these considerations, we included only self-report creativity in regression analysis as the dependent variable. Supervisor-rate creativity and invention disclosure were included in the correlational analysis as criterions for self-report creativity.

Because demographical variables were not the focus of present study, employee's age, gender, education level and tenure were included as control variables in all the analyses. The ZINB (Zero-Inflate Negative Binominal) model was used in regression of invention disclosures on other variables, considering that many employees (40%) in our sample have no papers and patents.

4. RESULTS

4.1. Preliminary partial correlational analysis among variables

We computed the mean, standard deviation and Cronbach's alpha coefficient for each of the variables, and performed zero-order correlational analysis among them after controlling employee's age, gender, education level and tenure. The results are showed in Table 1.

The three indexes of creativity were significantly correlated with each other. In the sample in which both invention disclosure and supervisor-rate data were available, the correlational coefficient between supervisor-rate creativity and invention disclosure was 0.36 ($p < 0.01$). In the samples in which only invention disclosure data was available and in which only supervisor-rate data was available, the correlational coefficients between self-report creativity and these two criteria were 0.03 ($p < 0.05$) and 0.23 ($p < 0.05$), respectively. These three correlations were in the same direction, and all of them were statistically significant. In addition, although connection, change and organizational commitment were not significantly correlated with supervisor-rate creativity and invention disclosure (which maybe is largely due to the small sample size), the coefficients were in the same direction. These results indicate that the three indexes of creativity were coherent, and the self-report measure employed in present study was valid.

The results in the correlational analysis preliminarily support the first hypothesis of present study: after controlling age, gender, education level and tenure, employee thinking style of connection was positively correlated with creativity, and thinking style of change was negatively correlated with

TABLE 1.

Means, Standard Deviations and Zero-order Correlational Coefficients of Variables

	M	SD	C1 (n=60)	C2 (n=81)	C3 (n=134)	T1 (n=134)	T2 (n=134)	OC (n=134)
C1: invention disclosures	2.90	5.49						
C2: supervisor-rate creativity	20.06	3.91	0.36**	0.90				
C3: self-report creativity	49.02	7.95	0.03*	0.23*	0.86			
T1: connection	22.45	3.10	0.05	0.01	0.29**	0.75		
T2: change	13.46	4.36	-0.03	-0.03	-0.23**	0.40**	0.74	
OC: organizational commitment	80.55	11.78	0.01	0.01	0.27**	0.12	-0.18*	0.76

Notes: "***" indicates $p < 0.01$, "**" indicates $p < 0.05$; numbers in the diagonal cells are Cronbach's alpha coefficients; employee's age, gender, education level and tenure were controlled in correlational analysis.

creativity. Employees with higher level of connection and lower level of change showed higher level of creativity.

4.2. Path analysis among variables using hierarchical regression

To further discover the relationship among employee thinking style of connection and change, organizational commitment, and creativity, we performed hierarchical regression analysis to examine the relational path among these variables, and tested potential mediation and moderating effects. Based on the previous analysis, only self-report data of creativity was included in the regression models as dependent variable.

4.3. Relationship between pairs of variables

After controlling demographical variables, we performed regression analysis of self-report creativity on connection, change and organizational commitment separately. The results confirmed the predictive effect of the three independent variables on creativity. Thinking style of change was a negative predictor of creativity ($\beta = -0.22, p = 0.01$), accounting for 5% of the variance. Thinking style of connection ($\beta = 0.30, p < 0.01$) and organizational commitment ($\beta = 0.27, p < 0.01$) were positive predictors of creativity, accounting for 9% and 7% of the variance, respectively.

4.4. Mediating effect of organizational commitment

To examine the mediating effect of organizational commitment on thinking style of change and creativity (H3), we first performed regression analysis of creativity on change and organizational commitment separately, and then entered both of them into the model as independent variables. The β value and significant level of change decreased ($\beta = -0.19, p < 0.05$),

while organizational commitment was a significant predictor of creativity ($\beta = 0.25, p < 0.01$) and change was a significant predictor of organizational commitment ($\beta = -0.18, p < 0.05$). Following Preacher and Hayes's (2004) practice, a sobel test was carried out to estimate the indirect effect of change, which revealed a partial mediating effect of organizational commitment between thinking style of change and creativity ($z = 2.05, p < 0.05$).

TABLE 2.

Zero-order Hierarchical Regression of Creativity on Change and Organizational Commitment

	R^2	ΔR^2	β
Step1: Control Variables	0.07*	0.07*	
Gender			-0.22*
Tenure			-0.12
Educational level			0.00
Type of position			0.06
Step2: Employee	0.12**	0.05**	
Change			-0.22**
Step3: Employee-Organization	0.18**	0.06**	
Organizational commitment			0.25**
Step4: Interaction	0.18**	0.00	
Change×Organizational commitment			-0.01

Notes: "***" indicates $p < 0.01$, "**" indicates $p < 0.05$;

Among the control variables there was a high correlation with age and tenure ($r = 0.7, p < 0.01$), so we only include tenure in the model to prevent multicollinearity.

4.5. Moderating effect of thinking style

We further entered interaction terms of connection \times organizational commitment and change \times organizational commitment into the regression model. Inconsistent with hypothesis 2, we found that both interaction terms' β and the proportion of accounted variance were non-significant (see Table 2).

However, according to the descriptive statistics, the mean of the current sample's connection was 22.45 ($SD = 3.10$), and the mean of the current sample's change was 13.46 ($SD = 4.36$). Compared with the norm sample (Hou, Zhu and Peng, 2004), where the mean of connection was 20.05 ($SD = 3.84$) and the mean of change was 19.62 ($SD = 5.40$), in the current sample the level of connection was higher and the level of change was lower. Furthermore, standard deviations of both dimensions of thinking style were smaller in the current sample. Therefore, in current sample, not only

the level of connection was higher and the level of change was lower, the distribution of both dimensions of thinking style was also more centralized. When testing the moderating effect of thinking style on the relationship between organizational commitment and creativity, such narrower distribution for thinking style data might make the potential moderating effect less effective.

We therefore transformed the continuous data of connection and change into ordinal data. Based on standardized data, participants with connection score higher than 1 standard deviation were classified as high connection group, participants with connection score lower than -1 standard deviation were classified as low connection group, and the rest were classified as medium connection group. The purpose of such transformation procedures was to amplify the variation in thinking style data, so as to exclude the impact of ceiling effect and floor effect on data analysis.

After transforming the data, we performed regression of creativity on organizational commitment for each group separately. The results indicated that regression coefficients were different among groups (see Table 3). For low connection group, the variance accounted for by organizational commitment was near zero, and the regression coefficient was non-significant. However, for both medium and high connection group, organizational commitment was a significant predictor of creativity. In medium connection group, organizational commitment's β was 0.31, accounting for 9% of variance ($p < 0.01$). In high connection group, organizational commitment's β increased to 0.62, and the variance accounted for increased to 27% ($p < 0.01$).

These results support hypothesis 2 and suggest that the relationship between employee organizational commitment and creativity vary as the level of connection changed. Specifically, the higher one's level of connection was, the greater the predictive effect of organizational commitment had on creativity. Similar analyses were carried out for thinking style on change. The moderating effect of change, however, was not clear.

To better view the moderating effect of connection on the relationship between organizational commitment and creativity, we depicted the results in Table 3 as an interaction plot. Following Cortina and colleagues' (2001), we also transformed employee organizational commitment into ordinal data. Based on standardized data, participants with organizational commitment score higher than 1 standard deviation were classified as high OC group, and participants with organizational commitment score lower than -1 standard deviation were classified as low OC group, while the rest were classified as medium OC group. The interaction effect of employee

organizational commitment and level of connection on creativity is shown in Figure 2.

TABLE 3.
Zero-order Hierarchical Regression of Creativity on Organizational Commitment
in Different Connection Group

		R^2	ΔR^2	β
Low connection group	Step1: Control Variables	0.42	0.42	
	Gender			-0.49
	Tenure			-0.09
	Educational level			-0.19
	Type of position			0.42
	Step2: Employee-Organization	0.42	0.00	
	Organizational commitment			0.06
Medium connection group	Step1: Control Variables	0.07	0.07	
	Gender			-0.22*
	Tenure			-0.06
	Educational level			0.10
	Type of position			0.04
	Step2: Employee-Organization	0.16	0.09**	
	Organizational commitment			0.31**
High connection group	Step1: Control Variables	0.10	0.10	
	Gender			-0.08
	Tenure			0.26
	Educational level			0.40
	Type of position			-0.06
	Step2: Employee-Organization	0.37	0.27*	
	Organizational commitment			0.62*

Notes: “***” indicates $p < 0.01$, “**” indicates $p < 0.05$;

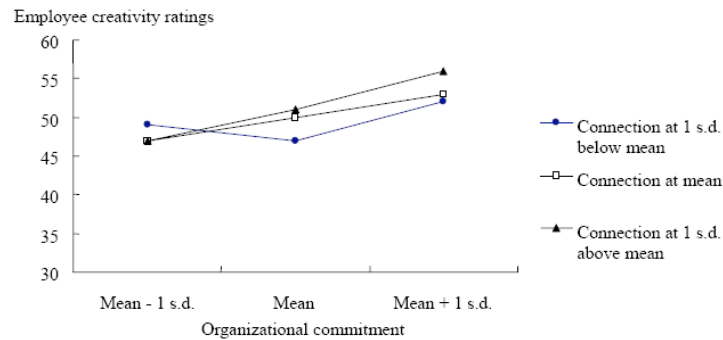
Among the control variables there was a high correlation with age and tenure ($r = 0.7, p < 0.01$), so we only include tenure in the model to prevent multicollinearity.

Overall, our results show that the self-reported creativity was high for those employees with high level of connection and organizational commitment. In addition, as the level of connection increased, the predictive effect of organizational commitment also increased, resulting in greater slope of the lines in Figure 2.

5. DISCUSSION AND CONCLUSION

This study proposed and tested three hypotheses about the relation among thinking style, organizational commitment and creativity of Chinese

FIG. 2. The Interaction Effect of Organizational Commitment and Level of Connection on Employee Creativity



employees. Our results supported H1 and H3 but not directly H2. H2 assumed that the influence of organizational commitment on employee creativity would be mediated by the thinking style of change of employees, which was not supported by regression results. But after we transformed the data into ordinal scale, employees with high, medium and low levels of change showed significant differences in terms of creativity that could be explained by organizational commitment, as shown in Figure 2. The trends of the three lines indicate that the positive correlations with organizational commitment and creativity increase with a higher change, which lends support to H2.

As mentioned earlier in this article, thinking style is kind of meta-cognition mode for an individual to view things, process information and solve problems. It affects employee creativity through thinking style as well as the individual's perception of organization. Consequently, connection and change can each affect employee creativity directly or indirectly:

In a direct path, thinking style determines how employee processes information that is relevant to the target question. Connection reflects employee's capacity to integrate different information, while change reflects the stability and consistency of employee's thought and behavior. Therefore, employee with high connection is more apt to formulate connections between uncombined resources at hand, and integrate available information and knowledge for problem-solving. At the same time, a stable and consistent thinking style is beneficial to reduce external disturbances and remove obstacles when faced with challenges.

In an indirect path, thinking style, the individual's macro meta-cognition mode, affects employee's cognition towards the organization, and such cog-

nition and attitude in turn determine employee's organizational behavior. Creativity is hindered if the employee lacks stable perception and psychological attachment to the organization. This is reflected in the way change can affect creativity through organizational commitment. Furthermore, this study also indicates the individual differences in the influence of organizational commitment on employee creativity. Employees with high connection show strong influence of organizational commitment on creativity, because he/she would be more skilled in integrating individual resources with organization's goal. But the same results reveal instability for low connection employees. This reminds us to rethink the role of organizational commitment, which in classical studies is simply treated as a positive antecedent of organizational behaviors.

It is particularly important to note that discussions on organizational commitment here are closely related to the target sample of this study. Swails (2000) analyzed both qualitatively and quantitatively the relationship of organizational commitment and employee creativity, and he came to the conclusion that the inevitable influence of the former on the latter is largely dependent on the industry changes and the boom of technological industry in today's society. Organizational commitment reflects employee's perception of the organization, which includes recognition of the organization's goal and willingness to perform consistent with it. In a post-industrial society, the goals of organizations have been changed from to-be-productive to to-be-innovative which heavily rely upon individual-level creativity. The dramatic change calls for supervisors and researchers to focus on the relationships between organizational commitment and creativity. In light of these results, participants of our study are all selected from R&D and IT service groups. As these people are typical knowledge workers in technological companies, the relation among their thinking style, organizational commitment and creativity will be more relevant as we look into detecting and fostering employee creativity in the context of modern organizations.

Furthermore, as this study focuses on connection and change, two important characteristics of Chinese employee thinking style, the general conclusions thus can be understood in a cultural context. First, the effect of the Chinese thinking style on employee creativity is twofold: connection displays a positive effect, while change is oftentimes negative. Previous researches have revealed the refraining impact of Chinese culture on individual creativity. Some have attributed to an interdependent society-oriented culture which emphasizes agreement to others much more than individual differences (Niu and Sternberg, 2001), while others believe this is related to the over reliance on rote learning and imitating in Chinese traditional

teachings (Gardner, 1989). From the perspective of Chinese thinking style, this study addresses such findings by identifying the former as only one aspect of the cultural influence on individual creativity, and indicates that Chinese culture also brings positive stimuli to individual creativity. Second, Chinese thinking style affects Chinese employee's creativity in multiple ways: through directly affecting thinking style, and also through indirectly affecting other organizational behavior variables. Unlike Zhang (2002a; 2002b) who discussed the relationship of thinking style and creativity of Westerners, this study does not stop at analyzing the relationship of the Chinese thinking style and creativity. The study puts the relationship in specific organizational context, and moves on to explore the intricate interaction of the relations with other organizational variables, and investigate concrete paths for how different features in thinking style affect employee creativity. This study, therefore, can be of good reference to managers of Chinese employees, especially with regards to innovation management, so that the cultural characteristics in thinking style and information processing can fully be considered, and the cultivation of employee thinking style of connection can be emphasized. Among other things, careful measures should be put into place to avoid the detrimental effect of change on employee organizational commitment and creativity, and customized training and guidance for employees should be developed. The goal is to help employees realize their potential and in turn enhance the company's competitiveness.

There are also some limitations in this study. For example, all our participants are from different groups in the same IT company. Therefore, it is possible that the external validity of our conclusions is affected by the sample homogeneity. In subsequent studies we will adopt wider distributed samples to test the relations of different variables. In addition, although we acquired invention disclosures, employee self-report and supervisor-rated evaluations to get a full view of employee creativity during data collection, supervisor-rated creativity and invention disclosures were not included for various reasons in the testing of the theoretical model (see Data Analysis section for related analysis). Subsequent studies will also adopt multi-measures on employee creativity. However, it should be noted that in the analysis of available data, the three creativity indexes used in this study exhibit good consistency, which further shows the effectiveness of self-evaluation, and the reliability of relations among Chinese employee thinking style, organizational commitment and creativity. Future studies can also get more details to analyze the relations among different variables. A range of important questions may be asked including: how thinking style

affects organizational variables other than organizational commitment; if there are any other mediators for thinking style to affect organizational commitment; and whether other types of workers (other than knowledge workers) show different relations between thinking style and creativity.

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