

# Thinking Styles, Creative Preferences, and Creative Personality among Chinese Students in Macau

Kuan Chen Tsai<sup>1</sup>

<sup>1</sup> Faculty of Humanities and Social Science, City University of Macau, Macau

Correspondence: Kuan Chen Tsai, Faculty of Humanities and Social Science, 81-121 Av. Xian Xing Hai, Golden Dragon Centre, 19 Andares, Macau. E-mail: [tsaikuanchen@cityu.edu.mo](mailto:tsaikuanchen@cityu.edu.mo)

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## Abstract

A number of studies have been conducted to inspect the correlation between thinking styles and other variables. Nevertheless, there has been no prior research concerning the possible link between students' thinking styles and their creative preferences. The purpose of the current study is twofold: seeking to determine (a) the distribution of thinking styles in Macau college students, and (b) to what extent their thinking styles correlate to their creative preferences. The results indicate that no specific thinking style dominated in our sample. Additionally, the results from zero-order correlations and hierarchical regression partially support our hypothesis in that Type I thinking has a more significant connection to creativity, whereas Type II thinking does not. These findings have important implications for educators to consider in curriculum design of how to tie to thinking styles to creative potential.

**Keywords:** thinking styles, creative personality, creative preferences, Macau students

## 1. Introduction

Intellectual styles, including cognitive styles, learning styles, and thinking styles, should be carefully distinguished from intellectual abilities (Zhang, 2008). As Zhang (2002b) notes, an ability "refers to what one can do, whereas a style refers to how one prefers to use one's abilities" (p. 179). Cognitive style is how individuals prefer to process certain information, while their learning style is how they approach topics when learning, and thinking style involves the construction of the learned material (Zhang, 2002a). After reviewing the thinking-styles literature in the field of education, Zhang (2002b) summarized its four major findings. First, the variation in students' thinking styles is contingent on their backgrounds and learning environments. Second, the variation in teachers' thinking styles likewise reflects on their backgrounds and the teaching environments, as well as teaching experiences. Third, when students' thinking styles match those of their teachers, they generally have better academic achievement than students whose thinking styles do not. Lastly, students' thinking styles only partly account for variations in their academic achievement (p. 180).

Sternberg (1988) proposed a theory of mental self-government, which later was adapted to denote individuals' thinking styles (Sternberg, 1997). He used the metaphor of governing a society to shed light on people's preferences for one thinking style over another. In Sternberg's analysis, a total of 13 identified thinking styles can be grouped into five dimensions: (a) functions (legislative, executive, and judicial styles); (b) forms (hierarchical, monarchic, oligarchic, and anarchic styles); (c) levels (global and local styles); (d) scopes (internal and external styles); and (e) leanings (liberal and conservative styles). Zhang (2005, p. 1916) further classified the same 13 thinking styles into three types, Zhang's Type I thinking styles relate to a creativity-generating tendency, and include the legislative (being creative), judicial (being analytical), hierarchical (dealing with multiple prioritized tasks), global (focusing on wholeness), and liberal styles (preferring new ways to deal with tasks). Type II thinking styles reflect a more norm-following tendency, and include the executive (conforming), local (focusing on details), monarchic (dealing with one task at a time), and conservative styles (preferring traditional ways of dealing with tasks). Lastly, Zhang's Type III thinking styles are the anarchic (dealing with tasks at random), oligarchic (dealing with multiple non-prioritized tasks), internal (enjoying working independently), and external styles (enjoying working in groups) styles. More detailed descriptions of the 13 styles are provided in Sternberg (1988, 1997) and Sternberg and Grigorenko (1997).

Research on mental self-government is well represented in the literature, and the theory has been tested in a number of different regions, including the United States (Richmond, Krank, & Cummings, 2006), China (Zhang, 2005), Hong Kong (Zhang, 1999), Taiwan (Tsai, Chang, Lin, & Yeh, 2007), the Philippines (Bernardo, Zhang, & Callueng, 2002), India (Atttri, 2014), and Jordan (Turki, 2012). Additionally, a number of studies have been conducted to inspect the correlation between thinking styles and other variables, such as personality (Zhang, 2002a), cognitive development (Zhang, 2002b), academic performance (Bernardo et al., 2002), learning styles (Zhang & Sternberg, 2000), and teaching styles (Zhang, 2008).

Nevertheless, to the best of our knowledge, there has been no prior research concerning the possible link between students' thinking styles and their creative preferences. Furthermore, although several correlational studies have reported the distribution of thinking styles in Chinese students from China, Hong Kong, and Taiwan, no such studies have been conducted with subjects from Macau. Thus, the purpose of the current study is twofold: seeking to determine (a) the distribution of thinking styles in Macau college students, and (b) to what extent their thinking styles correlate to their creative preferences. We anticipated that thinking styles would be statistically related to both creative preferences and personality. Students who exhibit Type I thinking styles *ipso facto* prefer situations in which their creativity and imagination are allowed free rein, whereas students with Type II styles tend to play it safe by following structures and orders, in the hope of making "right" decisions. Therefore, we further hypothesized that Type I thinking styles (legislative, judicial, hierarchical, global, and liberal) would show a significant positive correlation with creative preferences and creative personality, whereas Type II thinking styles (executive, local, monarchic, and conservative) would correlate negatively with the same factors.

## 2. Method

### 2.1 Participants

A convenience sample of 143 first-year Chinese undergraduates in Macau was collected, with ages ranging from 17 to 26 years ( $M = 19.08$ ,  $SD = 1.38$ ). The respondents were all enrolled in the same art and design program during the Fall 2014 semester, and consisted of 61 males and 82 females.

### 2.2 Measures

Three measures were used in the present study. All were of the self-report inventory type, with one regarding thinking styles, and the other two relating to creative preferences.

#### 2.2.1 Thinking Styles Inventory (TSI)

The first instrument was a short Chinese version of the TSI (Sternberg & Wagner, 1991; translated into Chinese by Xue, 1999). This 65-item inventory includes 13 scales, derived from the aforementioned thinking-styles theory proposed by Sternberg (1988, 1997). Each scale contains five statements, and allows respondents to evaluate themselves with regard to how they normally deal with tasks, on a 7-point scale ranging from 1 (not all well) to 7 (extremely well). The average of the five items answered is the score for that scale.

#### 2.2.2 Runco Ideational Behavior Scale (RIBS)

The self-reported RIBS (Runco, Plucker, & Lim, 2000-2001) was used as the basis of our creative preference. The RIBS was developed to measure individual ideation behavior, in particular the subject's use of and ability to generate ideas. It is similar to a divergent-thinking test, but differs significantly in its use of self-reporting as a tool to capture personal creative activities and attainments. The 23 items in the RIBS describe actual overt behavior related to ideation. A Likert scale is given with each item, ranging from 1 (never) to 5 (very often). The values are then summed to form an RIBS index. The validity and reliability of the RIBS was supported by Plucker, Runco, and Lim's (2006) study.

#### 2.2.3 Creative Personality Scale (CPS)

The third self-report instrument used in this study was the CPS (Gough, 1976) for the evaluation of creative personality. Consisting of 30 items, it asks individuals to place a check mark next to each adjective that best describes them, of which 18 are positive-weighting items (i.e. indicators of a creative person) and 12 are negative-weighting items (indicators of a non-creative person). According to Gough's scoring protocol, one point is given each time one of the 18 positive items is checked, and one point subtracted each time one of the 12 negative items is checked. Thus, the theoretical range of scores is from -12 to +18. For the purposes of the current study, the check-mark response format was modified slightly into a Yes/No format. The scores were summed to form a CPS index. Several studies have found that CPS is a reliable and valid measure of creative potential (Oldham & Cummings, 1996; Sheldon, 1995).

### 2.3 Procedures

The instruments were distributed at the first class meeting of the semester. The students were informed of the purpose of the study, and that participation in it was voluntary. Participants first provided basic demographic information (age, gender, and education). The test package was then distributed, and the participants were allowed 40 minutes to complete it.

### 3. Results

The alpha coefficients for the CPS and RIBS were acceptable, as shown in Table 1. Overall, the alpha coefficients for the 13 TSI scales were acceptable, though several were quite low. These were: Monarchic (.535), Oligarchic (.540), Anarchic (.539), Local (.515), and Global (.592). All 13 alpha coefficients were similar in magnitude to those reported in previous studies (Bernardo et al., 2002; Zhang, 1999).

Table 1. Means, standard deviations, and reliability of the three measures

Measure	M	SD	$\alpha$
CPS	3.16	3.60	.872
RIBS	75.12	11.42	.837
TSI			.911
Legislative	4.75	0.99	.704
Executive	4.65	0.95	.658
Judicial	4.42	1.13	.714
Hierarchic	4.43	1.12	.755
Monarchic	4.17	0.94	.535
Oligarchic	3.59	1.01	.540
Anarchic	4.43	0.95	.539
Internal	3.59	1.08	.708
External	5.25	1.06	.781
Liberal	4.53	1.05	.761
Conservative	3.59	1.01	.750
Local	3.77	0.84	.515
Global	4.28	0.91	.592

*Note.* CPS = Creative Personality Scale; RIBS = Runco Ideational Behavior Scale; TSI = Thinking Styles Inventory.

Table 2 shows zero-order correlations between the 13 scales of TSI, on the one hand, and CPS and RIBS. The relationships between seven TSI scales and CPS ranged from low (.26) to medium (.41) but all were significant. The other six scales of TSI were not significantly correlated to CPS. In contrast, all of the TSI scales except Conservative were significantly correlated to RIBS, with magnitudes again ranging from low (.24) to medium (.60).

Table 2. Intercorrelations for CPS and RIBS on 13 scales of TSI

Measure	CPS	RIBS
Legislative	.41**	.60**
Executive	.11	.32**
Judicial	.29**	.50**
Hierarchic	.26**	.29**
Monarchic	.15	.32**
Oligarchic	.08	.32**
Anarchic	.28**	.52**
Internal	.14	.37**
External	.39**	.31**
Liberal	.40**	.58**
Conservative	.01	.09
Local	.10	.24**
Global	.31**	.45**

\*\*  $p < .01$ .

In order to understand the TSI characteristics of the participants, gender differences were also examined. According to t tests, as shown in Table 3, the incidence of particular thinking styles was quite similar across male and female respondents. The only significant difference was in the dimension of Monarchic style,  $t(141) = 2.20$ ,  $p = .03$ ,  $d = .37$ . Female students had higher proportion of numbers whose thinking styles were monarchic.

Table 3. Prevalence of 13 thinking styles in male students ( $n = 61$ ) and female students ( $n = 82$ )

Thinking style	Males		Females		t(141)	p	Cohen's d
	M	SD	M	SD			
Legislative	4.81	0.92	4.71	1.05	0.56	.577	0.09
Executive	4.52	0.89	4.75	0.99	-1.41	.160	0.24
Judicial	4.35	1.08	4.48	1.17	-0.69	.488	0.12
Hierarchic	4.41	1.08	4.45	1.16	-0.17	.862	0.03
Monarchic	4.37	0.98	4.02	0.89	2.20	.030	0.37
Oligarchic	3.46	0.98	3.68	1.04	-1.33	.186	0.22
Anarchic	4.27	1.01	4.55	0.89	-1.75	.082	0.30
Internal	3.54	1.06	3.63	1.10	-0.48	.634	0.08
External	5.20	1.20	5.28	0.95	-0.44	.658	0.07
Liberal	4.35	1.05	4.66	1.03	-1.75	.083	0.30
Conservative	3.47	0.95	3.68	1.06	-1.19	.237	0.20
Local	3.63	0.82	3.87	0.84	-1.69	.094	0.29
Global	4.28	0.90	4.27	0.92	0.06	.955	0.01

In order to understand which thinking style had more predictive power vis-à-vis creative personality, hierarchical regression analysis was employed to incorporate Type I thinking and Type II thinking into the equation. Table 4 shows the nine steps in the equation, and indicates that only Legislative and Liberal thinking styles were valid predictors of individuals' creative personality. Of the two, Legislative thinking style ( $\beta = .41$ ) was a more

important factor than Liberal thinking style ( $\beta = .20$ ). This suggests that only two of the five Type I thinking styles were closely related to creative personality, and therefore that the hypothesis is only partially supported.

Table 4. Hierarchical regression analysis summary for two types of thinking styles predicting CPS scores

Step and predictor variable	B	SE B	$\beta$	R <sup>2</sup>	$\Delta R^2$
Type I thinking					
Step 1				0.16***	
Legislative	1.47	0.28	0.41***		
Step 2				0.17	.01
Judicial	0.42	0.27	0.13		
Step 3				0.18	.01
Hierarchic	0.54	0.27	0.17		
Step 4				0.20*	.02
Liberal	0.69	0.32	0.20*		
Step 5				0.20	.00
Global	0.28	0.37	0.07		
Type II thinking					
Step 6				0.21	.01
Executive	-0.55	0.35	-0.15		
Step 7				0.22	.01
Monarchic	-0.50	0.36	-0.13		
Step 8				0.22	.00
Conservative	0.17	0.35	0.05		
Step 9				0.22	.00
Local	-0.49	0.39	-0.11		

\* $p < .05$ . \*\*\* $p < .001$ .

Another hierarchical regression was also performed, using RIBS as the criterion. As shown in Table 5, three thinking styles were valid predictors of creative personality: Legislative, Judicial, and Liberal. Among these, the Legislative style was the most powerful predictor ( $\beta = .60$ ). All Type II thinking variables were excluded from the equation. Again, this result partially supports the hypothesis of the current study.

Table 5. Hierarchical regression analysis summary for two types of thinking styles predicting RIBS scores

Step and predictor variable	B	SE B	$\beta$	R <sup>2</sup>	$\Delta R^2$
Type I thinking					
Step 1				0.35***	
Legislative	6.87	0.77	.60***		
Step 2				0.42***	.07
Judicial	2.92	0.73	0.29***		
Step 3				0.42	.00
Hierarchic	0.98	0.72	0.10		
Step 4				0.47***	.05
Liberal	3.24	0.84	0.30		

Step 5				0.47	.00
Global	0.91	0.95	0.07		
Type II thinking					
Step 6				0.47	.00
Executive	0.74	0.90	0.06		
Step 7				0.47	.00
Monarchic	0.41	0.95	0.03		
Step 8				0.47	.00
Conservative	0.11	0.91	0.01		
Step 9				0.47	.00
Local	-1.60	1.03	-0.12		

\*\*\* $p < .001$ .

#### 4. Discussion

The main purpose of this study was to examine the distribution of 13 thinking styles among Chinese undergraduates in Macau and to investigate whether Type I thinking (Legislative, Judicial, Hierarchical, Global, and Liberal) or Type II thinking (Executive, Local, Monarchic, and Conservative) has a more meaningful relationship with creative personality and creative preferences. When our sample was dichotomized into people, who had, and who did not have, a given thinking styles, *t* tests indicated a non-significant difference between the two groups. In other words, the number of students with legislative and non-legislative preferences was almost equivalent. As far as gender was concerned, the results also lead in a similar direction; for example, the number of legislative thinkers being quite similar across men and women respondents. On the whole, it seems that no specific thinking style dominated in our sample.

The results from zero-order correlations and hierarchical regression partially support our hypothesis in that Type I thinking has a more significant connection to creativity, whereas Type II thinking does not. Intercorrelations between CPS and the 13 thinking styles (see Table 2) revealed that, all five Type I thinking styles had a significant positive relation to creative personality, whereas no Type II thinking styles had such a relation. Nevertheless, when using creative preferences (RIBS) as the criterion, the picture was not as clear-cut: with all Type I and Type II thinking styles (except Conservative) showing significant positive correlation with creative preferences. In order to shed light on this apparent anomaly, two hierarchical regression analyses were used to further examine the relationship between Type I and II thinking and creative personality and preferences. These indicated that when put Type I and Type II thinking were included in the equation to predict creative personality (CPS), only the Legislative and Liberal thinking styles had any valid predictive power, with Legislative thinking having more weight in this regard (see Table 4). When we used creative preferences (RIBS) as the criterion, only three variables (Legislative, Judicial, and Liberal) were influential predictors of RIBS, and among these, Legislative was again the most influential (see Table 5). Taken together, these results seem to indicate that no aspect of Type II thinking was a meaningful predictor of either creative personality or creative preferences. Additionally, only two Type I thinking styles (Legislative and Liberal) were acceptable predictors of CPS and RIBS at the same time. As such, it is prudent to say that although all Type I thinking styles correlate with creative personality and creative preferences, only the Legislative and Liberal styles are powerful predictors thereof.

#### 5. Limitations and Implications

The obvious limitations of the present study render its findings suggestive rather than conclusive. First, the results are derived from self-reported data, which cannot possibly reflect “real” behavioral situations. As Zhang (2008) reminds us, “self-report tests may elicit self-belief as a response to the statements presented rather than an independently verified psychological structure reflecting true individual differences” (p. 50). Therefore, the results do not conclusively demonstrate any causal link between the thinking styles and creativity. Second, the current study measured creative preferences rather than real creative performance; thus, the relationship between an individual subject’s thinking style(s) and his creative achievements in real life remains unknown. This drawback suggests a possible avenue for future studies: the examination of actual creative works.

Another possible confounding factor is that some of the TSI scales have low alpha coefficients, which might affect the reliability of the measurement. Although other scholars have argued that TSI is a reliable and acceptable measurement, it seems that a revised version of the TSI may be needed. Finally, because sample investigated in the present study was Chinese, the inclusion of samples from other ethnic groups might yield more generalizable findings. More generally, it would seem that more cross-cultural study is necessary if we are to explain the possible congruences and disparities in the relationships between thinking styles and creativity across different groups.

Despite these limitations, however, the current study has several important implications for educators. First, it has generally confirmed that the TSI is a useful measure. Educators may benefit from being more aware of their students' thinking styles, and with this knowledge, creating and designing curricula that match teaching styles to the students' thinking styles. Such awareness should be conducive to effective student learning. When using the TSI, educators may already have a broad sense of what thinking preferences exist among their students; the next step may therefore be to rethink their curricula and teaching strategies, thereby capitalizing on students' strengths and compensating for their own weaknesses.

The major finding of the current study is the confirmation that Type I thinking is, as expected, closely related to creative potential. It suggests that if educators notice some of their students have a strong tendency toward Type I thinking, it may be beneficial to employ some teaching tactics to promote these students' creativity, in order to maximize their creative potential. Furthermore, every educator should be aware of the diversity of thinking styles among students, an awareness that should lead to different teaching approaches. In other words, if lectures are the only medium of instruction, the course is probably not optimal in terms of students' learning, due to the existence of diverse thinking styles.

## 6. Conclusions

The main objective of the present study has been to examine the extent to which Chinese students' thinking styles are associated with their creative preferences and creative personality. Empirical results indicate that the number of students possessing and not possessing each of the 13 subcategories of TSI is more or less equal. Similar results were found across the genders.

The contributions of the current study are both conceptual and practical. Conceptually, our findings could provide a better understanding of Chinese students' thinking styles in Macau, thereby enriching the growing body of knowledge in this field. At the same time, such findings have practical implications for teachers considering issues of teacher-student style match or mismatch. Most importantly, the current study confirms that Type I thinking has more a meaningful relationship to creative personality and preferences than Type II thinking does. Therefore, the next step for educators to consider in curriculum design is how to tie to thinking styles to creative potential.

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