

Further Cross-Cultural Validation of the Theory of Mental Self-Government

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ABSTRACT. This study was designed to achieve two objectives. The 1st was to investigate the cross-cultural validity of the Thinking Styles Inventory (TSI; R. J. Sternberg & R. K. Wagner, 1992), which is based on the theory of mental self-government (R. J. Sternberg, 1988, 1990, 1997). The 2nd was to examine the relationships between thinking styles as assessed by the TSI and a number of student characteristics, including age, gender, college class level, work experience, and travel experience. One hundred fifty-one students from the University of Hong Kong participated in the study. Results indicated that the thinking styles evaluated by the TSI could be identified among the participants. Moreover, there were significant relationships between certain thinking styles, especially creativity-relevant styles and 3 student characteristics: age, work experience, and travel experience. Implications of these findings for teaching and learning in and outside the classroom are discussed.

ONE COULD OBSERVE THE FOLLOWING PHENOMENON in any higher educational institution: A student did relatively poorly in a multiple-choice test; yet, the same student produced the best individual project among her class of 200 peers. Why? Quite obviously, the student is poor in responding to multiple-choice items but good at conducting individual projects. According to Sternberg's (1988, 1990, 1997) theory of mental self-government, multiple-choice questions and individual projects require very different thinking styles. Academic achievement is contingent not only on one's ability but also on a match between one's cognitive styles and one's work environment (also see Lee-Corbin, 1993; Saracho, 1991, 1993; Witkin & Moore, 1974). Thus, the phenomenon mentioned here leads us to one reason to examine university students' thinking styles.

A second reason for studying thinking styles is to examine the relationships between thinking styles and creativity. Sternberg and Lubart (1995) argued that

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the education of creativity can be beneficial for both the individual student and the society. The results of a number of research studies have supported meaningful relationships between certain thinking styles and creativity. For example, Agor (1991) argued that the use of an intuitive thinking style would foster creativity in organizations. In Jacobson's (1993) study of British management students with work experience, a statistically significant positive relationship was found between innovation style, as tapped by the Kirton Adaption-Innovation Inventory (Kirton, 1982), and the extraversion and feeling dimensions of the Myers-Briggs Type Indicator (Myers, 1962). In their study of a sample of Korean high school students, Kim and Michael (1995) did not identify any significant relationship between creativity measures and school achievement. Instead, they found that students classified as using a thinking style preference believed to be associated with right-brain dominance were likely to achieve significantly higher scores on creativity measures than those who were classified as showing a thinking style preference hypothesized to be connected with either a left-brain dominance or an integrated-brain dominance.

This second reason for studying thinking styles is highlighted by Sternberg and Lubart's (1995) telling view that thinking styles are one of the six major resources that give rise to creativity. Given that thinking styles may well play such an important part in creativity, and that the cultivation of creativity is one of the important missions of higher education (Pascarella & Terenzini, 1991), university students' thinking styles need to be investigated.

In the past two decades, many different theories of thinking styles have been proposed. For instance, Holland (1973) argued that six styles (realistic, investigative, artistic, social, enterprising, and conventional) could be used as a basis for understanding job interests. Renzulli and Smith (1978) proposed various learning styles, each corresponding to a method of teaching (e.g., discussion, drill and citation, and projects). Gregorc (1985) suggested four types of styles, based on all possible combinations of two dimensions—concrete versus abstract and sequential versus random. Myers (1980; Myers & McCaulley, 1988) proposed a series of psychological types based on Jung's (1923) theory of types. According to Myers, there are 16 types resulting from all possible combinations of two ways of perceiving—sensing versus intuiting; two ways of judging—thinking versus feeling; two ways of dealing with self and others—introversion versus extroversion; and two ways of dealing with the outer world—judgment versus perception. Detailed reviews of thinking styles can be found in Kogan (1983) and in Grigorenko and Sternberg (1995).

However, as pointed out by Grigorenko and Sternberg (1995), other theories of thinking have not been of styles but of specific aspects of cognitive stylistic functioning. For example, Kagan's (1976) work addressed the differences between impulsive and reflective individuals, whereas Witkin's (1978) theory dealt with the differences between field-independent and field-dependent persons. What was needed was a more general theory. The theory underlying the present

study—the theory of mental self-government (Sternberg, 1988, 1990, 1997)—was designed for this purpose.

The Theory of Mental Self-Government

According to the theory of mental self-government (Sternberg, 1988, 1990, 1997), people need somehow to manage their everyday activities. There are many ways of doing so, and people choose styles of managing themselves with which they are comfortable. Furthermore, an individual with a certain preference in one situation may have a different preference in another situation, for people are at least somewhat flexible in using their styles. Thinking styles are, at least in part, socialized (Sternberg, 1994, 1997), suggesting that they can, to some degree, be modified by the environment in which people live. Sternberg compared an individual's mental functioning to the government of a society. In his theory, he postulated 13 thinking styles that fall along five dimensions of mental self-government: (a) functions, (b) forms, (c) levels, (d) scopes, and (e) leanings, as applied to individuals.

Functions

There are three functions in mental self-government: legislative, executive, and judicial. An individual with a *legislative* style enjoys being engaged in tasks that require creative strategies. An individual with an *executive* style is more concerned with implementation of tasks with set guidelines. An individual with a *judicial* style focuses attention on evaluating the products of others' activities.

Forms

Mental self-government takes four different forms: monarchic, hierarchic, oligarchic, and anarchic. An individual with a *monarchic* style enjoys being engaged in tasks that allow full focus on one thing at a time. An individual with a *hierarchic* style can distribute attention to several prioritized tasks. An individual with an *oligarchic* style can also work toward multiple objectives during the same time frame but may have trouble setting priorities. Finally, an individual with an *anarchic* style enjoys working on projects that would grant great flexibility as to what, where, when, and how the work is done.

Levels

Mental self-government is at two different levels, local and global. An individual with a *local* style enjoys being engaged in tasks that allow work with specific details. In contrast, an individual with a *global* style would direct attention to global and abstract ideas.

Scopes

There are two scopes of mental self-government, internal and external. An individual with an *internal* style enjoys being engaged in tasks that allow work to be done as an independent unit. An individual with an *external* style likes to be engaged in tasks that provide opportunities to interact with other people.

Leanings

In mental self-government, there are two leanings, liberal and conservative. An individual with a *liberal* style enjoys being engaged in tasks that involve novelty and ambiguity, whereas a *conservative* person tends to abide by the existing rules and procedures in performing tasks.

I chose the theory of mental self-government as the foundation of the current research for an important reason. The theoretical constructs as well as the inventories generated from the theory have proved to be valuable in examining teaching and learning. For example, in one such study, Sternberg and Grigorenko (1995) found significant relationships between the teaching styles and the grade taught, the length of the teaching experience, and the subject area taught. A second set of findings revealed significant relationships between students' learning styles and such demographic data as students' socioeconomic levels and birth orders (Sternberg & Grigorenko). A third data set indicated that teachers inadvertently favored those students who had thinking styles similar to their own (Sternberg & Grigorenko).

In a more recent study, Grigorenko and Sternberg (1997) found that certain thinking styles contributed significantly to a prediction of academic performance over and above the prediction of ability tests. They also indicated that students with particular thinking styles do better in some forms of evaluation than in others.

As with many other theories of styles, however, little research has been dedicated to the study of non-Western students' thinking styles as defined in the theory of mental self-government. The only non-Western study using this theory was carried out in Hong Kong by Zhang and Sachs (1997), the results of which showed that the thinking styles defined by Sternberg's theory could also be identified among university students in Hong Kong. However, the alpha coefficients for the Anarchic (.54) and Local (.58) scales were relatively low. The lowest alpha coefficient in Sternberg's (1994) study was .42 (Monarchic).

In the present study, I examined further the short version of the Thinking Styles Inventory (TSI; Sternberg & Wagner, 1992) and its underlying theory of mental self-government for a sample in Hong Kong. Specifically, on the basis of the characteristics of styles described in Sternberg's (1994, 1997) theory, I made the following hypotheses:

First, because thinking styles are measurable (Sternberg, 1994, 1997), the TSI can be used to identify the thinking styles of Hong Kong's university stu-

dents. Specifically, each of the 13 scales will have an alpha coefficient above .50. Moreover, factor analysis procedures will extract five factors corresponding to the five dimensions delineated in the theory of mental self-government. Second, because styles are in part socialized (Sternberg, 1994, 1997), students will be significantly different in their thinking styles (directions not specified) based on such background variables as age, birth order, college class level, field of study, marital status, gender, type of school attended, travel experience, length of work experience, and their parents' educational level.

Method

Sample

University of Hong Kong students ($N = 151$; 57 men, 88 women, 6 unspecified) enrolled in the 1997 spring semester completed the TSI (in English) and provided the necessary demographic information (e.g., age, college class level, gender). The participants (80 from the Faculty of Education and 71 from the School of Business) were studying for a Bachelor of Education, Postgraduate Certificate of Education, Master of Education, or Master of Business Administration.

The participants, aged 19 to 50 ($M = 30.5$; $Mdn = 31$), had, on the average, traveled to 10 cities other than Hong Kong, ranging from 1 to 57 (2 participants indicated that they had never been outside Hong Kong). The median and mode were 6 and 19 cities, respectively. Ninety-eight participants indicated that they had work experience. The average was 11.8 years, ranging from 2 to 26 years. The median and the mode were 11 and 10 years, respectively.

Measure of Thinking Styles

The TSI (Sternberg & Wagner, 1992) is a self-report test consisting of 65 statements (13 scales of 5 items per scale). For each statement, the participants were asked to rate themselves on a 7-point scale ranging from 1 (indicating that the statement does not describe them at all) to 7 (indicating that the statement characterizes them extremely well). These 13 scales correspond to the 13 types of thinking styles illustrated in the theory of mental self-government. The Appendix contains sample items, one from each of the 13 scales.

Normative data were collected by Sternberg and Wagner (1992) for various age groups on the long version of the TSI (104 items, 8 for each of the 13 scales). For their college sample, scale reliabilities ranged from .42 (Monarchic) to .88 (External), with a median of .78. In another study with the TSI, Sternberg (1994) found a five-factor model fitting to the five dimensions of mental self-government described in Sternberg's (1988) theory of thinking styles. These five factors accounted for 77% of the variance in their data.

The inventory has also been examined against other inventories based on different theories of thinking styles (e.g., Myers-Briggs Type Indicator, Gregorc's measure of mind styles) as well as a standard IQ test, the Scholastic Assessment Test (verbal and math), and against grade point average. Results from these construct validity studies showed that the TSI is a reliable and valid instrument for examining thinking styles of students in the United States.

In Zhang and Sachs's (1997) study, the scale reliabilities ranged from .53 to .87, with a median of .70. Also, one of the significant correlations (Monarchic and Hierarchic) was in the direction opposite to that predicted by the theory. Furthermore, only three factors similar to those in the theory were extracted, accounting for 66% of the variance in the data.

Data Analysis

The internal consistency of each of the 13 scales was estimated with Cronbach's alpha coefficient. An intercorrelation matrix of the 13 scales was obtained by calculating the Pearson product-moment correlations. I performed an exploratory factor analysis using the oblimin procedure to identify the dimensions of thinking styles within this particular sample. I also performed a one-way analysis of variance (ANOVA) to examine the mean differences in thinking styles by the student characteristics of age, birth order, college class level, field of study, marital status, gender, type of school attended before entering university, travel experience, length of work experience, and parents' educational level. The Scheffé procedure was employed for post hoc comparisons.

Results

Scale Reliabilities

The alpha coefficients, ranging from .46 (the only one below .50) to .89, with a median of .71 for the 13 scales, are reported in Table 1. These estimates are similar to those reported in Sternberg's (1994) study, in which the long version of the inventory was used, and to those in Zhang and Sachs's (1997) study, in which the short version was used.

Scale Intercorrelations

Intercorrelations for the 13 scales are contained in Table 2. The absolute values of these scale correlations ranged from .00 to .73. Essentially, these correlations were in the direction predicted by the theory of mental self-government. Examples are Legislative versus Liberal ($r = .52$), Executive versus Conservative ($r = .73$), Judicial versus Hierarchical ($r = .61$), Conservative versus Liberal ($r = -.41$), and Internal versus External ($r = -.19$). The first four correlations were significant at the .01 level, and the last was significant at the .05 level.

TABLE 1
Alpha Coefficients for Thinking Styles Inventory Scales
(*N* = 151)

Scale	<i>M</i>	<i>SD</i>	α
1. Legislative	4.67	.87	.70
2. Executive	4.53	.83	.63
3. Judicial	4.70	.83	.71
4. Global	4.23	.71	.58
5. Local	4.18	.78	.53
6. Liberal	4.56	1.03	.85
7. Conservative	3.97	1.14	.89
8. Hierarchical	4.99	.99	.81
9. Monarchic	4.21	.83	.56
10. Oligarchic	4.55	.95	.79
11. Anarchic	4.38	.74	.46
12. Internal	4.10	1.07	.76
13. External	4.96	1.01	.80

TABLE 2
Interscale Pearson Correlation Matrix for 13 Scales of the
Thinking Styles Inventory (*N* = 151)

Scale	1	2	3	4	5	6	7	8	9	10	11	12
1. Legislative												
2. Executive	.18											
3. Judicial	.37	.09										
4. Global	.27	.16	.08									
5. Local	.23	.39	.53	-.07								
6. Liberal	.52	-.14	.61	.20	.30							
7. Conservative	.01	.73	-.12	.18	.20	-.41						
8. Hierarchical	.35	.23	.61	.17	.36	.46	-.08					
9. Monarchic	.23	.48	.13	.19	.30	.06	.44	.21				
10. Oligarchic	.18	.55	.23	.18	.37	.03	.49	.32	.47			
11. Anarchic	.45	.18	.43	.15	.41	.48	.06	.34	.07	.17		
12. Internal	.58	.31	.10	.19	.25	.27	.21	.13	.35	.07	.34	
13. External	.28	.00	.54	.21	.28	.48	-.18	.51	.11	.31	.31	-.18

However, one of the significant correlations was in the direction that was not predicted by the theory of mental self-government. That is, the correlation between Monarchic and Hierarchical was .21 ($p < .01$). This result is consistent with that obtained in the previous study conducted in Hong Kong (Zhang & Sachs, 1997).

Factor Analysis

I subjected the TSI scales to a principal axis factor analysis. Visual inspection of eigenvalues with the scree test (Cattell, 1966) supported the possible extraction of four or five factors. However, the five-factor model was more in line with the theory of mental self-government. Therefore, I retained five factors and used the oblimin procedure to rotate the factors to oblique simple structure. These five factors accounted for 78.4% of the variance. Factor 1 showed high loadings on hierarchical, judicial, and liberal styles; Factor 2 was dominated by conservative, executive, and oligarchic styles. The third factor contrasted internal style with external style, and the fourth factor contrasted the global style with the local style. Finally, the fifth factor contrasted the monarchic and anarchic style.

Mean Differences in Thinking Styles on Background Variables

The results of the ANOVA procedures indicated that the participants' thinking styles were not significantly different ($p > .05$) in terms of the following background variables: birth order, college class level, field of study, marital status, gender, type of school attended, and parents' educational level. Participants' thinking styles were significantly different by age, travel experience, and work experience. The significantly different results are contained in Table 3.

Participants who were 33 years old or older scored significantly higher ($M = 4.96$, $p = .001$) on the Judicial scale than those between 19 and 26 years old ($M = 4.37$). Participants who were 27 years old or older scored significantly higher ($M = 4.80$, $p = .001$) on the Liberal scale than the younger students ($M = 4.10$), and the younger participants scored significantly higher ($M = 4.27$, $p = .01$) on the Conservative style than the older participants ($M = 3.47$). Participants who were 39 years ($M_{\text{hier}} = 5.44$, $M_{\text{ext}} = 5.29$) or older scored significantly higher ($p_{\text{hier}} = .01$; $p_{\text{ext}} = .02$) on the Hierarchical and the External styles than those who were 26 or younger ($M_{\text{hier}} = 4.73$; $M_{\text{ext}} = 4.63$).

Participants who reported more travel experience (21 or more cities; $M_{\text{legi}} = 5.64$; $M_{\text{int}} = 5.08$) scored significantly higher ($p_{\text{legi}} = .001$; $p_{\text{int}} = .001$) on the Legislative and Internal scales than those who reported less travel experience ($M_{\text{legi}} = 4.60$; $M_{\text{int}} = 3.99$). Participants who reported more travel experience (9 or more cities; $M_{\text{glob}} = 4.50$; $M_{\text{loc}} = 5.04$) scored significantly higher ($p_{\text{glob}} = .001$; $p_{\text{loc}} = .001$) on the Global and Liberal scales than those who reported less travel experience ($M_{\text{glob}} = 4.07$; $M_{\text{loc}} = 4.33$).

Participants who had more work experience (16–26 years; $M_{\text{jud}} = 5.04$; $M_{\text{hier}} = 5.47$; $M_{\text{ext}} = 5.46$) scored significantly higher ($p_{\text{jud}} = .01$; $p_{\text{hier}} = .02$; $p_{\text{ext}} = .00$) on Judicial, Hierarchical, and External thinking styles than those who had no work experience ($M_{\text{jud}} = 4.42$; $M_{\text{hier}} = 4.79$; $M_{\text{ext}} = 4.65$). Participants who had more work experience (9–26 years; $M_{\text{lib}} = 4.84$) also scored significantly higher ($p_{\text{lib}} = .001$) on the Liberal scale than those who had no work experience ($M_{\text{lib}} = 4.14$). The thinking

TABLE 3
Mean Differences in Thinking Styles, by Age, Travel Experience, and Work Experience

Characteristic	Legislative	Judicial	Global	Liberal	Conservative	Hierarchical	Internal	External
Age								
19-26		4.37 ^{LL}		4.10 ^{LLL}	4.27 ^H	4.73 ^L		4.63 ^L
27-32		4.69		4.80 ^H	3.47 ^L	4.91		5.17
33-38		4.95 ^H		4.83 ^H	3.86	5.06		5.04
39-50		4.96 ^H		4.78 ^H	4.14	5.44 ^H		5.29 ^H
<i>p</i>		.001		.001	.01	.02		.02
Travel experience (No. of cities)								
1-8	4.50 ^L		4.07 ^{LL}	4.33 ^{LL}			4.08 ^L	
9-20	4.70 ^L		4.41 ^H	4.77 ^H			3.89 ^L	
21-57	5.64 ^{HH}		4.59 ^H	5.31 ^H			5.08 ^{HH}	
<i>p</i>	.001		.001	.001			.001	
Work experience (No. of years)								
None		4.42 ^L		4.14 ^{LL}		4.79 ^L		4.65 ^L
2-8		4.74		4.71		4.91		5.03
9-15		4.82		4.75 ^H		5.03		4.95
16-26		5.04 ^H		4.93 ^H		5.47 ^H		5.46 ^H
<i>p</i>		.01		.001		.02		.001

Note. ^Hdenotes a group mean significantly higher than one other group mean. ^{HH}denotes a group mean significantly higher than two other group means. ^Ldenotes a group mean significantly lower than one other group mean. ^{LL}denotes a group mean significantly lower than two other group means. ^{LLL}denotes a group mean significantly lower than three other group means.

styles of those who had 2 to 8 years of work experience did not differ significantly from those of any other group.

Discussion

In this study, I examined whether or to what extent the thinking styles delineated by Sternberg (1988, 1990, 1997) were manifest among a sample of Hong Kong university students. I also examined the differences, based on certain personal characteristics, in the participants' thinking styles.

The TSI proved to be reasonably reliable and valid for identifying the thinking styles of this sample of university students in Hong Kong. First, the observed internal consistency reliability estimates of the 13 TSI scales were similar in magnitude to those reported by Sternberg (1988, 1990, 1997) and to those reported by Zhang and Sachs (1997). The weak scales were Monarchic ($\alpha = .56$), Anarchic ($\alpha = .46$), and Local ($\alpha = .53$). The Monarchic reliability estimate was similar to that found by Sternberg (1994; $\alpha = .42$), and the latter two were similar to estimates in Zhang and Sachs (1997; α for Anarchic scale was $.54$, and α for Local scale was $.58$). On the basis of these studies, the scales Anarchic, Monarchic, and Local need to be revised.

Second, like the findings in Zhang and Sachs (1997), all but one of the correlations were in the direction predicted by Sternberg's theory. In fact, some of the absolute values of the correlations were not as high as those in Sternberg's (1994) study. This result might be attributed to the fact that the participants in the current study were tested in their second language (see Zhang & Sachs, 1997). However, unlike the Zhang and Sachs study, in which only three factors corresponding to the theory of mental self-government were extracted, results from the factor analysis in the current study were remarkably similar to the findings in Sternberg's (1994) study. The five factors also corresponded closely to the five dimensions in the theory of mental self-government.

On the basis of Sternberg's notion (1988, 1997) that styles are in part socialized (also see Saracho, 1993), a range of socialization variables were examined against the mean differences in participants' thinking styles. Results of these analyses lent only partial support to the hypothesis. Participants were not significantly different in any of the 13 thinking styles on the basis of such socialization variables as birth order, college class level, field of study, marital status, gender, and type of school attended before entering the university. This finding did not support the argument that styles are in part socialized (e.g., Hale, 1983; Hunt, 1964; Ramirez, Castaneda, & Herold, 1974; Shipman, 1973; Steward & Steward, 1974). Theoretically, we should be able to identify significant differences among these variables, because thinking styles should be a function of differential socialization, especially across genders. Yet, this was not the case in the current study.

Furthermore, the lack of significant differences in thinking styles on the basis of the aforementioned variables is inconsistent with previous research using

the TSI. Sternberg and Grigorenko (1995) identified significant differences in students' thinking styles across such socialization variables as birth order and socioeconomic status. In a study of teachers, Sternberg and Grigorenko also found significant relationships between teaching styles and such variables as class taught and subject area taught. Moreover, Zhang and Sachs (1997) found significant differences in participants' thinking styles on the basis of such variables as college class level, field of study, gender, and subject area taught. Therefore, no conclusion can thus far be drawn based on the results of studies already conducted.

Nevertheless, my hypothesis that styles are in part socialized was supported when examined across age, travel experience, and length of work experience. Among the many significant group differences reported in the results section, a clear pattern could be identified; that is, older participants—those with more work and travel experience—tended to use more effective thinking styles such as hierarchical, external, global, legislative, and liberal. Among these styles, legislative and liberal styles are creativity-relevant styles (Sternberg, 1997).

Implications and Applications

The results of this study demonstrated a variety of thinking styles among the participants. The results also indicated that age, travel experience, and work experience were significantly related to the participants' thinking styles. What are the implications of these results? How could we as educators use this information? First, given the wide variation in students' thinking styles, we should allow for diversity in teaching and learning in and outside the classroom. Second, because creativity-relevant styles have a significant and positive relationship with experience (work and travel), we can nurture creativity through increasing students' experience.

Allow for a Variety of Thinking Styles

One of Sternberg's motives in proposing the theory of mental self-government was to provide a useful tool for teachers to enhance the effectiveness of teaching and learning. He argued that teachers should "allow for thinking styles" (1994, 1997). What does "allow for thinking styles" mean? In the context of teaching and learning, the essence of allowing for thinking styles is to create a learning environment in which students with different thinking styles can capitalize on their unique but effective ways of thinking and learning and compensate for their less effective ways of thinking and learning. Allowing for thinking styles can foster student development in at least two dimensions, intellectual and interpersonal.

In Sternberg's (1988, 1990, 1994, 1997) discussions of the implications of allowing for thinking styles for students' intellectual development, his major argument is that both instruction and assessment should be diversified so that

students are provided with the opportunities to show their strengths and correct for their weaknesses. For instance, students who tend to think creatively (legislative and liberal thinkers) may prefer working on a project, whereas students who are adept at using their memories (executive thinkers) may find a multiple-choice test more attractive. Thus, students who perform poorly on one type of assignment may excel on another.

Why do instructional methodology and assessment exercises affect students' learning and thinking styles? Consider the "backwash" effect of assessment. Biggs (1995) pointed out that assessment drives the ways by which students learn and think, the content of the curriculum, as well as how teachers teach. Therefore, if the assessment scheme allows for diversity in thinking styles, students would naturally have more opportunities to demonstrate their talents in their own preferred ways.

I would argue, however, that the implications of "allowing for thinking styles" go beyond fostering student development in the intellectual domain. Recognition of different thinking styles can also foster student interpersonal development. For instance, if teachers know that students have different styles of learning, they may facilitate cooperative learning among students. Cooperative learning provides opportunities for students to interact with their peers, demonstrate their strengths and, at the same time, learn from others about more effective ways of dealing with problems (Saracho & Spodek, 1981, 1986).

After studying thinking styles in business organizations, Agor (1991) concluded that "In the final analysis, what most helps an organization avoid errors and gain advantages from two perspectives, is the systematic integration of intuitive and traditional management skills and styles" (p. 13). In educational settings, effective learning depends on the effective cooperation among students with different styles. By working together, students will not only learn intellectual skills from one other, but they also will learn more about how to communicate their ideas effectively and how to tolerate different people, ideas, and values.

Creativity Can Be Fostered Through Experience

It is true that styles, as Sternberg claimed, are preferred ways of doing things, and therefore, one style is as good as the other. Furthermore, there are advantages to grouping people of different styles together. However, in Hong Kong there are too many students who tend to use thinking styles (such as executive and local) that will be ineffective for future career survival. After conducting research on university teaching and learning in Hong Kong, Wong and Kember (1997) reported that "Unfortunately our data showed the greatest evidence by far of the combination of passive learning and transmissive teaching" (p. 35).

These "executive" and "local" student thinkers are not there by accident, but rather are a result of socialization. Being in an environment of quantitative assessment tradition, these students are merely trying to meet the demands of the

course requirements. In fact, Biggs (1995) has criticized typical Hong Kong teaching and learning approaches as overly quantitative and nurturant of executive and local thinkers. By the same token, Kim and Michael (1995) pointed out that in higher education, high academic achievement tends to depend on convergent abilities to meet highly structured objectives rather than on divergent thinking abilities that occur in "unstructured and fluid learning environments" (p. 71). Then, the question arises as to how creative thinking styles could be cultivated.

According to Sternberg, styles are partially socialized and therefore teachable. Thus, creative styles can also be taught and learned. Results in the current study indicated that participants with more travel experience and work experience used more effective thinking styles such as global, hierarchical, legislative, and liberal. Among these styles, legislative and liberal styles are associated with using creative strategies (Sternberg & Lubart, 1995). In other words, the results of this study indicate that more travel experience and more work experience may lead the participants to using creativity-relevant thinking styles in their work, in and outside the classroom.

Given that there is a positive correlation between creative thinking styles and travel and work experience, one could conclude that increasing students' travel and work experience would be one way of cultivating creative styles. I would argue even further that travel and work experience should not be the only two types of experience that could help to increase creativity. What really has made the difference is the "experience," regardless of its kind. Research has shown that experiences or involvement inside and outside the classroom have positive effects on college outcomes, including an effect on creative thinking (Astin, 1989; Hattie et al., 1997).

Underlying these experiences or involvement is the opportunity to be confronted with conflicts, and thus, the challenge to solve the problems. There is strong evidence that effective thinking (creative thinking being one kind) can be facilitated by working through problem-solving procedures, and that inadequate experience may interfere with effective thinking (e.g., Batchelder & Root, 1994; Gordon, 1990; Petersen, Leffert, & Graham, 1995). How can teachers provide experiences that are conducive to creative thinking? Two ways are suggested here. One is related to classroom situations; the other is associated with students' experiences outside the classroom.

First, because thinking styles are partially socialized and teachable (Saracho, 1993; Sternberg, 1988, 1990, 1997), teachers can cultivate creative styles by modeling creativity through a variety of instructional methods such as having guest speakers, facilitating cooperative learning, having group discussion, having seminars, and using different visual aids in teaching, as opposed to merely lecturing. Instead of asking questions that require standard answers, teachers could present questions that require creative thinking. Instead of consistently giving the same format of tests, teachers could use a variety of assessments, including those that challenge students to think creatively.

Second, teachers could cultivate creativity by providing students with the opportunities to be exposed to different experiences outside the classroom. This can be accomplished in a variety of ways. One way is through organizing adventure education. The results of the meta-analysis conducted by Hattie et al. (1997) revealed the significant impact of adventure education on students' creative thinking.

Conclusions

The current research has shown that the TSI is essentially a reliable and valid instrument for identifying the thinking styles among students at the University of Hong Kong. The dimensions that resulted from the factor analysis were clearly consistent with those defined in the theory of mental self-government. However, two (Monarchic and Hierarchic) of the 13 scales had a statistically significant correlation that was not predicted by the theory. Therefore, further examination of the TSI is needed. For example, it could be translated into Chinese and tested again with the university students in Hong Kong as well as with students in other Chinese societies such as Taiwan and mainland China.

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APPENDIX

Sample Items From the Thinking Styles Inventory

Sample items	Scale type
• I like tasks that allow me to do things my own way.	Legislative
• I like situations in which it is clear what role I must play or in what way I should participate.	Executive
• I like to evaluate and compare different points of view on issues that interest me.	Judicial
• I like to complete what I am doing before starting something else.	Monarchic
• When undertaking some task, I like first to come up with a list of things that the task will require me to do and to assign an order to the items on the list.	Hierarchic of priority
• I usually know what things need to be done, but I sometimes have trouble deciding in what order to do them.	Oligarchic
• When working on a written project, I usually let my mind wander and my pen follow up on whatever thoughts cross my mind.	Anarchic
• Usually when I make a decision, I don't pay much attention to details.	Global
• I like problems that require engagement with details.	Local

- I like to be alone when working on a problem. Internal
 - I like to work with others rather than by myself. External
 - I like to do things in new ways, even if I am not sure they are the best ways. Liberal
 - In my work, I like to keep close to what has been done before. Conservative
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