

Taiwanese Elementary Students' Creativity, Creative Personality, and Learning Styles: An Exploratory Study

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In the field of education, creativity has been viewed as an important ability for children's development. The recognition of different learning styles is also important for both teachers and learners. Although a handful of studies have examined the relationship between creativity and personality, or between creativity and cognitive style, few have assessed creativity, creative personality, and learning preferences simultaneously. Thus, the purpose of this study is to explore possible linkages between these three variables in Taiwanese children. More centrally, the research empirically probes into relating the personality and cognitive-style profiles of children, with creativity as a byproduct. The major finding of this research is that creative personality is positively related to creativity. Additionally, the results of multiple regression indicated that, among the variables studied, creative personality is the only valid variable for the prediction of creativity. Unexpectedly, none of the learning dimensions served as good predictors of creativity.

Dans le domaine de l'éducation, on perçoit la créativité comme capacité importante au développement des enfants. Il est également important, tant pour les enseignants que les élèves, que l'on reconnaisse différents styles d'apprentissage. Si une poignée d'études se sont penchées sur le rapport entre la créativité et la personnalité, ou la créativité et le style cognitif, peu d'études ont porté à la fois sur la créativité, la personnalité créative et les préférences en apprentissage. L'objectif de cette étude est justement d'explorer les liens potentiels entre ces trois variables chez des enfants taiwanais. Plus précisément, cette recherche empirique met en lien la personnalité et le style cognitif des enfants avec la créativité comme sous-produit. Les conclusions indiquent qu'une personnalité créative est en corrélation positive avec la créativité. De plus, les résultats d'une analyse de régression multiple indiquent que parmi les variables étudiées, la personnalité créative est la seule avec un caractère prédicteur valide pour la créativité. Contrairement aux attentes, aucune dimension d'apprentissage n'a servi de bon prédicteur de créativité.

Introduction

Assessing creativity is a hot topic in the creativity research community (Hennessey & Amabile, 2010; Runco, 2004). Researchers from the psychometrics tradition primarily concerned with the construction and validation of measurement instruments for such as abilities, attitudes, and personality traits. There are two key trends of creativity research: investigating individual

creative thinking, and detecting creative personality. A significant number of measurement instruments have therefore been developed, the major function of which is to uncover individuals' creative potential. This movement reflects not only on educational utility but also on business practice. On the one hand, creativity research is primarily conducted with children, partially because of the needs of gifted education programs: educators hope to use a reliable test as a criterion for selecting children with high creative potential (Lemons, 2011; Runco & Albert, 1985). From the organizational-development viewpoint, on the other hand, creativity and innovation are seen as important abilities for longitudinal survival (Woodman, Sawyer, & Griffin, 1993). Thus, organizations also want to use these creativity tests to screen candidates as part of their human resource management practices (Mumford, 2000).

The primary theoretical underpinning of these creativity tests, at least in school contexts, is the idea of divergent thinking as a leading indicator for creativity, as initially proposed by Guilford (1950) and later extended by other scholars (Torrance, 1974; Wallach & Kogan, 1965). Although the use of divergent thinking has been criticized by various creativity researchers as being insufficient to capturing real creative performance (Hocevar, 1981; Treffinger, Renzulli, & Feldhusen, 1971), it is still viewed as a valid and useful approach in the creativity-research community (Kim, 2006; Plucker, 1999). The argument in favor of divergent thinking is grounded in Guilford's (1956) psychometric framework, where divergent thinking is the key element of creative thinking; in contrast, convergent thinking is associated with raw intelligence. This notion has been supported by various studies that recognize a flexible (divergent) thinking style as a hallmark of creativity (Baas, De Dreu, & Nijstad, 2011; Hennessey & Amabile, 2010).

The linkage between creativity and creative personality traits has been well documented in the literature (Barron & Harrington, 1981; Batey & Furnham, 2006). The search for the shared characteristics of creative people from different groups and across different domains has found a fairly stable set of core traits: wide interests, attraction to complexity, high energy, autonomy, independence, self-confidence, and high valuation of aesthetics (Amabile, 1996; Sternberg & Lubart, 1995). According to Feist's (1998) meta-analysis of personality across creative scientists, artists, and laypeople, he found that the largest effect sizes were on openness, conscientiousness, self-acceptance, hostility, and impulsivity.

Learning style, considered as a mechanism, reflects learners' favorite approaches to perceiving, organizing, and processing information (Li, 2012; Vita, 2001). To some extent, learning style can be attributed to learners' variation and different needs (Wang, 2007). In the field of education, the recognition of learning style is important for both teachers and learners (Bedford, 2006; Kolb & Kolb, 2006). For teachers, increased awareness of the variety of learning styles can guide improvement in course-delivery methods. Students can also benefit from understanding their learning-style preferences, which can help them to strengthen their knowledge acquisition. The research has indicated that only when teaching styles fit learning styles can students enhance their learning progress (Jorgensen, 2006; Vita, 2001). Over the past three decades, inspired by cognitive psychology, several scholars have devoted themselves to developing models and measurement instruments for identifying individual learning styles. These include the Learning Style Inventory (LSI; Kolb, 1976), the Learning Style Questionnaire (LSQ; Honey & Mumford, 1982), the Herrmann Brain Dominance Instrument (HBDI; Herrmann, 1989), and the Index of Learning Styles (ILS; Felder & Solomon, 1997). In general, these models attempt to locate learners in one of four quadrant preferences. However, some researchers have argued that individual learning preferences cannot be dichotomized, but instead occur on a continuous spectrum (Curry, 1983). Most importantly, these diverse theories

share a consensus that everyone is different and therefore cannot be taught in the same way. The implication for educational practice is that teachers should not utilize a one-size-fits-all teaching approach to deliver knowledge, and that good practice should incorporate a variety of teaching styles to reach and address different leaning dimensions, thereby stretching students' repertoire of learning styles.

Although a handful of studies have examined the relationship between creativity and personality, or between creativity and cognitive style, few have assessed these three variables simultaneously. For example, in one study conducted by Meneely and Portillo (2005), 39 U.S. college design majors were evaluated using the Gough Adjective Check List scored for Domino's Creativity Scale (ACL-Cr; Domino, 1970); the Herrmann Brain Dominance Instrument (HBDI; Herrmann, 1989); and their creative performance in designing three-dimensional book storage. The results of the study showed that cognitive flexibility was a significant predictor of creative personality and creative personality as assessed by ACL-Cr was a significant predictor of product creativity, accounting for 15% and 11% of the variance, respectively (Meneely and Portillo, 2005). However, HBDI did not directly predict creative performance. As a result, Meneely and Portillo (2005) suggested that cognitive style may be a necessary, but not sufficient, variable to account for creativity in the design context.

In contrast to Meneely and Portillo's (2005) study, the focal point of this study is to explore possible linkages between creativity, creative personality, and learning preferences in Taiwanese children. More centrally, it empirically probes into relating the personality and cognitive-style profiles of children, with creativity as a byproduct. For this study, the definition of creativity was based on Guilford's (1950, 1956) work, including idea fluency (quantity of ideas), idea flexibility (idea categories), idea originality (unique ideas), and idea elaboration (quantity of ideas).

This study asked three research questions: a) What profiles of creative personality traits and learning styles characterize Taiwanese children? b) What relationships emerge between creative personality and learning preferences? and c) How do children's profiles relate to creativity? Ideally, this study can awaken teachers to the individual learning differences and creative potential of their students, and inspire them to develop optimized teaching strategies that more closely fit students' particular needs. In addition, the approaches based on this research can help students to cultivate their own creative potential.

Method

To explore the relationships between and among creativity, creative personality, and learning styles, this study employed multiple measures. First, creativity was evaluated using two creativity tests. Then personality trait and learning style profiles were collected using two self-reporting instruments. All instruments were translated from English into Mandarin Chinese and checked by two elementary school teachers. This was done to verify that the translation was accurate and would be correctly understood by Chinese-speaking students.

Participants

A total of 45 children were recruited for this study: 24 in grade six and 21 in grade five (*M* age 11.7 years, *SD* = .73), all enrolled in the same elementary school in Taipei, Taiwan. Among the participants, 21 were boys and 24 were girls. The study was conducted during the second semester of the 2013-14 academic year.

Instruments

Creativity tests. A set of two divergent thinking tests was used for the assessment of creativity. The first task was Alternate Uses (Guilford, 1967), in which students were asked to name all the uses for a newspaper. This task was designed to measure flexibility of thinking as part of an investigation of creative thinking. The second was the Instances Task (Wallach & Kogan, 1965), in which examinees were asked to name as many items containing wheels as they could. Both these creativity tests focus on the verbal content of divergent thinking.

The scoring of these tasks comprised four components: originality, fluency, flexibility, and elaboration. However, Hocevar (1979) has indicated that in the traditional divergent thinking tests (e.g., Alternate Uses), fluency and originality have the issue of showing discriminate validity. In addition, measures of originality and flexibility are inflated by ideational fluency. Therefore, following Hocevar's (1979) suggestions, the scoring of creativity in this study lays emphasis on originality. Responses received either zero or one point according to their frequency in the total sample of students, with responses that were provided by more than 5% of the sample being given zero points for originality. Another calculated score is flexibility, which was counted the number of different categories being used. The total creativity scores were computed as an average of the sum of responses for originality and flexibility.

Creative Personality Scale (CPS). This adjective check list was developed by Gough (1979). Thirty items are included in the CPS, 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, whereas one point is subtracted each time one of the remaining 12 negative items is checked. Thus, the theoretical range of scores is from -12 to +18. Based on a pool of 1701 samples, Gough reported alpha coefficient reliabilities ranging from .73 to .81. After checking reliability and convergent validity, Gough argued that CPS is a "reliable and moderately valid measure of creative potential" (1979, p. 1404). A significant number of creativity studies have suggested CPS is a reliable and useful instrument for capturing creative personality (Barron & Harrington, 1981; Runco, 2004).

The Index of Learning Styles (ILS). This inventory was developed by Felder and Solomon (1997) for the identification of different learning styles. ILS is a 44-question instrument in which each of four learning styles is associated with 11 items. Each item, in turn, has two options (a and b), representing one or the other of two categories associated with that learning style. ILS's four learning styles, and their associated categories, are as follows: processing (active/reflective), perception (sensing/intuitive), input (visual/verbal), and understanding (sequential/global). More specifically, according to the work of Felder and Spurlin (2005), these four bi-polar dimensions are a) active (prefer working in groups) vs. reflective (prefer working alone) (the A-R dimension); b) sensing (concrete thinker) vs. intuitive (abstract thinker) (the S-N dimension); c) visual (prefer visual presentations) vs. verbal (prefer written and spoken explanations) (the Vs-Vb dimension); and d) sequential (linear thinking process) vs. global (holistic thinking process) (the Sq-G dimension).

Felder and Spurlin (2005) examined several studies that had used ILS and reported that the validity and reliability of this construct were adequately supported. Litzinger, Lee, Wise, and Felder (2007) reexamined the reliability, factor structure, and construct validity of ILS using random samples of 1000 students from three colleges. They arrived the conclusion that ILS

“generates data with acceptable levels of internal consistency reliability, and that evidence for its construct validity from both factor analysis and student feedback is strong” (Litzinger, et al., 2007, p. 316). A number of research have suggested that a connection between thinking styles and creativity (e.g., Cropley, 2006; Wechsler, Vendramini, & Oakland, 2012). It is believed that thinking styles and learning styles are closely related. However, there is a sparse literature examining creativity and learning style. Therefore, this line of research deserves more attention. With the suggestion of Litzinger et al, the current study used ILS as a criterion for learning styles.

Procedures

The participants in the study were informed that it would involve two paper-and-pencil creativity tests, a personality inventory, and a learning-style inventory. First, participants were administered a set of two timed divergent thinking tests, each with five minutes to complete. Then they were given a questionnaire booklet containing CPS and ILS, without any time limit. All participants finished all four tasks within 40 minutes in a classroom setting. After they were finished, a five-minute debriefing session was conducted.

Results

Our assessment of students' learning preferences, as shown in Table 1, indicates that on two dimensions—sensing-intuitive (S-N) and sequential-global (Sq-G)—there were fairly equal (?) distributions of students. However, in the case of the active-reflective dimension, the majority of students in the sample were active learners (71.1%), and this difference was significant, $\chi^2(1) = 8.02$, $p = .005$. A similar difference was found between visual and verbal preferences, with the visual preference (66.7%) significantly more popular than verbal one.

Table 1

Students' Learning-Style Profiles

Dimension	<i>N</i>	%	$\chi^2(1)$	<i>p</i>
A-R			8.02	.005
Active	32	71.1		
Reflective	13	28.9		
S-N			1.09	.30
Sensing	26	57.8		
Intuitive	19	42.2		
Vs-Vb			5.00	.03
Visual	30	66.7		
Verbal	15	33.3		
Sq-G			0.56	.46
Sequential	25	44.4		
Global	20	55.6		

In the process of computing zero-order correlations among eight variables, several meaningful relationships were identified. Table 2 shows weak but significant relationships between CPS, on the one hand, and on the other, creativity ($r = .30$), S-N ($-.32$), and Sq-G ($-.34$). Strong correlations were also found between creativity, originality, and flexibility, ranging from $.57$ to $.91$. Among the four learning preferences, only moderate relationships were found between A-R and Vs-Vb ($.41$) and between S-N and Sq-G ($.42$).

While the strength of relationships among variables can be seen in Table 2, multiple regression was also employed to estimate the relationship between a criterion variable and several predictors. Table 3 demonstrates that CPS was the only effective predictor of creativity. The estimated regression coefficient denotes that as CPS increases by one unit, the creativity score can be expected to increase by $.12$. In addition, when excluding other variables, CPS only accounts for 9% of variation in the prediction of creativity.

From Table 3, it can clearly to be seen that the four learning preferences were not good predictors of creativity. However, in this model, the relationship between CPS and leaning styles was not clear. Thus, another regression was computed using a hierarchical regression technique. As Table 4 indicates, only S-N is a successful predictor of CPS. More specifically, when S-N increases by one unit, the CPS score decreases by 2.47 . Moreover, S-N only accounts for 12% of variation in the prediction of CPS.

Table 2

Means, Standard Deviations, and Intercorrelations for Scores on Eight Measures of Creativity and Learning Styles (N = 45)

Measure	M	SD	1	2	3	4	5	6	7	8
1. CPS	3.04	3.59	--							
2. Originality	3.18	1.45	.29	--						
3. Flexibility	3.72	1.18	.24	.57**	--					
4. Creativity	3.45	1.16	.30*	.91**	.86**	--				
5. A-R	6.36	2.39	.03	.18	.17	.20	--			
6. S-N	5.91	2.20	-.32*	.05	-.19	-.07	-.05	--		
7. Vs-Vb	6.67	2.67	-.18	.21	.03	.15	.41**	.25	--	
8. Sq-G	5.60	1.94	-.34*	-.16	-.04	-.12	.14	.42**	.09	--

Note. A-R = Active-Reflective; S-N = Sensing-Intuitive; Vs-Vb = Visual-Verbal; Sq-G = Sequential-Global.

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

Table 3

Regression Analysis Summary for CPS and Learning Styles Predicting Creativity

Variable	B	SE B	β	t	p
CPS	.12	.05	.37	2.22	.03
A-R	.30	.38	.12	0.79	.44
S-N	.11	.37	.05	0.31	.76
Vs-Vb	.59	.38	.24	1.55	.13
Sq-G	-.02	.36	-.01	-0.06	.96

Note. $R^2 = .173$, Adjusted $R^2 = .067$.

Table 4

Hierarchical Regression Analysis Summary for Learning Styles Predicting CPS

Step and predictor	<i>B</i>	<i>SE B</i>	β	R^2	ΔR^2
Step 1:				.00	.00
A-R	0.17	1.19	.02		
Step 2:				.12	.18*
S-N	-2.47	1.04	-.34		
Step 3:				.15	.03
Vs-Vb	-1.41	1.12	-.19		
Step 4:				.22	.07
Sq-G	-1.97	1.03	-.28		

* $p < .05$.

Discussion

The major finding of this research is that creative personality is positively related to creativity. Our observations suggest that students with higher creative personalities have a tendency to be intuitive learners and global thinkers. Intuitive learners tend to be abstract and imaginative, while global learners prefer processing knowledge in a holistic way and understand it from a broader context. After the employment of a regression technique, the results further indicated that only the sensing-intuitive dimension was a good predictor to creative personality. However, this finding might be biased due to the small sample size. Therefore, it would be reasonable to collect more samples to validate this finding.

In order to further understand the relationships among learning styles, creative personality, and creativity, a series of multiple regressions were executed. The results show that, among the variables studied, creative personality is the only valid variable for the prediction of creativity. Surprisingly, none of the four learning dimensions served as good predictors of creativity. This finding is similar to that of Meneely and Portillo (2005), who found that learning preferences did not directly predict creative performance. It seems unlikely that viewing learning styles even as an indicator of creative potential would produce strong results. After all, the manifestation of creativity requires the contributions of individual ability, skill, personality, and motivation (Amabile, 1996). At best, it can be speculated that some learning styles might play a partial role in affecting creative personality, which in turn influences creative performance.

Study Limitations

With regard to interpretation of the findings, some limitations merit further discussion. First, the sample size was small, which would tend to reduce its generalizability, statistical power, and interpretative confidence. Due to the exploratory nature of the current study, the convenience sampling was used and the researcher recruited only 45 respondents. Thus, it is suggested that larger sample sizes are needed for future study in order to increase precision of estimating parameters, which in turn makes robust conclusion. Second, our measure of creativity was based on divergent thinking tasks, which at best can account for partially facets of creativity;

involving real creative performance or products could strengthen the validity of the research. Contextual factors should also be taken into consideration. This study used instruments developed by North American scholars to examine Taiwanese children. A cross-cultural study would be a worthwhile investigational approach for future researchers; cross-group and cross-methodology approaches could also reveal interesting results.

Implications for Practice

In our sample, most students preferred active and visual learning styles, indicating that they enjoyed being examined and discussing their knowledge with others. Active learners might drive the most benefit from dialogue and teamwork activities. In addition, visual learners welcome course content being presented in the form of pictures, diagrams, and films (Li, 2012; Wang, 2007). It is suggested that educators can use different teaching strategies and tools to maximize students' learning. For instance, in order to help students understand content more clearly, teachers can use some diagrams and pictures to deliver knowledge. Using group discussions, playing games, and writing reflective papers, will also reinforce knowledge acquisition for students. Kolb and Kolb's (2006) study on learning styles and learning spaces in experimental learning provides a valuable reference for Chinese practitioners to follow. In short, teachers should adjust their teaching styles to cater to students' learning preferences and as Vita (2001) notes, "good practice must, therefore, translate into using a variety of teaching styles and address each side of each learning dimension ... and engage all students while enabling them to stretch their repertoire of learning styles at their own pace" (p.170).

Another important implication is concerning promoting creativity in Chinese classroom. Unfortunately, in the typical East Asian classroom, rote learning and memorization still the major teaching strategy in a system that may overestimate the relative value of knowledge acquisition (Ho & Ho, 2008). It is true that educators should take cultural issues into consideration while employing teaching strategies for encouraging creativity in Chinese students. Several scholars in fact have argued that the benefits and necessity of promoting creativity in East Asian classroom (Ng, 2003; Niu & Sternberg, 2003). For example, Horng, Hong, ChanLin, Chang, and Chu (2005) discovered that several distinct creative teaching instruction methods are useful in Taiwanese classroom, including student-centered activities, multimedia assistance, class management, connection of teaching contents to real life, open questions, and encouragement to creative thinking (see especially pp. 356-357). In sum, a large number of Western studies have discussed how to unleash students' creativity and Chinese teachers should take advantage of this research and should adjust these strategies to some extent in response to cultural differences.

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