

An Exploratory Study of Investigating the Creative Potential of Taiwanese Children

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Abstract

The question of whether creativity should be viewed as domain-general or domain-specific, and unidimensional or multidimensional, have led to a vibrant discussion among students of creativity. Following a reviewing of the relevant literature, it was decided that the present study would focus its investigation of the creative potential of Taiwanese students on verbal and visual creative abilities. Three major findings were found: first, that the relationship between verbal and visual creativity was moderate and significant, while the relationship between ideational behavior, on the one hand, and verbal creativity and visual creativity, on the other, was weak and non-significant. Second, as illustrated by our perceptual map, it appears that verbal and visual creativity are different constructs, which might tend to support the domain-specific theory of creativity. Finally, gender did not function as a moderator between verbal and visual creativity.

Keywords: creativity, visual creativity, verbal creativity, ideational behavior, Taiwanese children

Introduction

The question of whether creativity should be viewed as domain-general or domain-specific, and unidimensional or multidimensional, have led to a vibrant discussion among students of creativity (Hocevar, 1980; Kim, 2006; Mayer, 1999; Mouchiroud & Lubart, 2002; Palmiero, Nakatani, Raver, Belardinelli, & van Leeuwen, 2010; Simonton, 2012a). While compelling enough in a purely theoretical sense, these issues related directly to questions surrounding how creativity training ought to be implemented, and how creativity tests ought to be scored (Dow & Mayer, 2004; Hong, Peng, O’Neil, & Wu, 2013). Baer (1993) provides at least three reasons for

pursuing a general theory of creativity: a one-size-fits-all theory makes it easier to explain the creative process, to predict creative behavior, and to demonstrate a unity among different creative activities. Most importantly, from Baer’s perspective, the use of a single model of creativity renders “the testing and training of creativity-relevant skills easier and more effective” (p. 1). However, Baer warns that the search for an all-encompassing theory will limit creativity research.

Simonton (2012b) argues that the biggest problem with a domain-specific view is that its advocates do not look at creativity as a whole, which might lead them to fail to see the forest for the trees. In

other words, creativity should be understood as a psychological behavior. According to Simonton's (2009a) hierarchical model of creative domains, creativity can be found in the order of domains as follows, from the top down: the abstract sciences, the physical sciences, the biological sciences, the psychological sciences, the social sciences, the humanities, and the arts. This hierarchical arrangement has two meanings: first, objectivity has a much bigger ground at the top of domains, whereas the subjective dimension is grouped toward the bottom; second, at the bottom will be those domains that impose the fewest constraints on creativity, whereas those domains that ask creators to meet more rigorous criteria will be located at the top. The underlying assumption of Simonton's hierarchical arrangement is that domain-specific creativity can be arrayed from the logical, objective, and conventional to the intuitive, emotional, and subjective. In addition, the hierarchical ordering is assigned a psychological foundation in terms of disposition and development, which factors in turn affect a creator's success in a chosen domain (Simonton, 2009a).

Kaufman and Baer (2009), however, have disputed this proposition about the unidimensionality of creativity, arguing that the multidimensional perspective is more close to reality. After conducting a series of empirical studies, Baer (1998) concluded that creativity should be domain specific, and Baer (1994) also suggested that various creativity training programs can only be effective on certain types of creative abilities (i.e., verbal, visual, and numerical creative abilities). Other empirical studies also support this idea. For example, Palmiero et al.

(2010) found that verbal and visual creativity are not cross-domains, but are mostly domain-specific processes. More specifically, visual creativity is a more domain- and task-specific trait, whereas verbal creativity is considered to be task-independent. By using confirmatory factor analyses, Kim (2006) found that the Torrance Tests of Creative Thinking Figural form (TTCT; Torrance, 1974), which is the most popular creativity test around the world (Kaufman & Baer, 2006), involves two factors rather than one. Given the construct validity of creativity tests, this result at least suggests that creativity should not be treated as one-dimensional. In sum, regarding the issue of domain-specific versus universal creativity skills, it is probably safe to state that, "both positions are partly right" (Ward, Smith, & Fink, 1999, p. 208) and the answer may depend on the levels of analysis applied.

Following a reviewing of the relevant literature, it was decided that the present study would focus its investigation of the creative potential of Taiwanese students on verbal and visual creative abilities. As a result, our research questions are: (a) What is the relationship between verbal and visual creativity in Taiwanese children? (b) Does creativity relate to ideational behavior? (c) Does gender act as a moderator between verbal and visual creativity?

Method

Participants

A total of 17 Taiwanese ten year olds were invited to participate in this exploratory study.

Of these participants, the majority were female ($N = 12$) and in third grade ($N = 15$). All those who were invited were volunteered to participate in the study, and the experiment was held during the 2013-14 academic year.

Instruments

Three measures of creative potential were employed in this study: (a) a verbal creativity test, Alternate Uses (Guilford, 1967); (b) a figural creativity test, Test for Creative Thinking—Drawing Production (Jellen & Urban, 1986); and (c) a self-reported ideational behavior checklist, Runco Ideational Behavior Scale (Runco, Plucker, & Lim, 2000-2001). All instruments were translated into Chinese and checked by two Taiwanese elementary teachers.

Verbal creativity. A divergent-thinking test was used for the assessment of verbal creativity. The task was Alternate Uses (Guilford, 1967). Students were asked to name all the uses for a brick. This task was designed to measure flexibility of thinking within the context of an investigation of creative thinking. For the present study, the scoring of creativity placed emphasis on two components: originality and fluency. Following Hocevar's (1979) suggestions, responses received either zero or one point according to their frequency in the total sample of students. Responses that were given by more than 5% of the sample were given zero points for originality. The other calculated score was fluency, defined as the number of generated items. The total creativity scores were computed as an

average of the sum of the scores for originality and fluency.

Figural creativity. The Test for Creative Thinking—Drawing Production (TCT-DP; Jellen and Urban, 1986) was used to evaluate the children's figural creativity. This instrument was designed to evaluate creative thinking via analysis of drawing production. The rationale of this test is rooted in a Gestalt theory; therefore, subjects are given six fragments to encourage them to complete an imaginative or innovative drawing. From the perspective of Gestalt theory, creative product is believed to reflect "the character of a gestalt composition or the coherence of an organization" (Urban & Jellen, 1986, p. 165). In particular, it embodies a holistic approach to creative production and focuses on the final shape or form (in German "Gestalt") of the end product, as well as how it was shaped. Following this notion, the scoring of TCT-DP is broken down into 11 key elements including *boundary breaking*, *unconventionality*, *new elements*, and *humor*, each being awarded a maximum of six points. The creativity score is computed as the sum of these various sub-dimensions.

The TCT-DP is especially recommended by Cropley (2000), whose review of different types of creative-thinking tests and concluded that this instrument has the advantage of being based on a more general creativity theory. Additionally, Chae (2003) argues that the biggest advantage of the TCT-DP is grounded in its utility, since it is both simple and economical to use. Most importantly, the TCT-DP has been found to be valid, reliable, and culturally fair (Jellen & Urban, 1986).

Ideational behavior. The Runco Ideational Behavior Scale (RIBS; Runco, Plucker, & Lim, 2000-2001) was developed to measure individual ideation behavior, in particular the use of, and the ability to generate ideas. This measurement 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. In all, 23 items in the RIBS describe actual overt behavior related to ideation. According to Runco et al. (2000-2001), the RIBS is a reliable instrument, but its construct validity is somewhat ambiguous. They found two factors in the RIBS, but due to lack of theoretical justification for this, they suggest one-factor structure for the interpretation of RIBS results. As a result, the RIBS score for the current study was computed as the sum of the 23 items. Cronbach's alpha estimates were .94 for the current study, suggesting a high level of reliability.

Procedure

All participants were informed of the purpose of this study, which was administered in a classroom

setting. They first were given five minutes in which to complete the verbal creativity task. Subsequently, they were allowed ten minutes for the figural creativity test. Finally, the students completed the self-reported RIBS; this was not time-limited, but in the event, no student took more than ten minutes to complete it. The whole procedure lasted less than 25 minutes. After all three tasks were finished, students were provided with a debriefing session and the administrator answered their questions related to this study.

Results

A Pearson correlation coefficient was calculated for the relationship between four variables. Table 1 indicates that a strong positive correlation ($r = .75, p < .01$) was found between fluency and originality, and that a moderate relationship was also found between TCT-DP and fluency ($r = .54, p < .05$). However, no significant relationships between ideational behavior and verbal and visual creativity were found.

Table 1
Means, Standard Deviations, and Intercorrelations on Four Measures of Creativity

Measure	<i>M</i>	<i>SD</i>	1	2	3	4
Verbal creativity						
1. Fluency	8.59	3.39	--			
2. Originality	4.24	2.56	.75**	--		
Figural creativity						
3. TCT-DP	28.00	10.80	.54*	.46	--	
Ideational behavior						
4. RIBS	68.24	21.28	.32	.25	.44	--

Note. TCT-DP = Test for Creative Thinking-Drawing Production; RIBS = Runco Ideational Behavior Scale.

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

As far as gender is concerned, an independent-samples *t* test was calculated as shown in Table 2. A significant difference between male and female participants was found only in ideational

behavior, $t(15) = -2.36, p = .03$, effect size $d = 1.26$. The mean for the girls was significantly higher ($M = 75.17, SD = 19.77$) than the mean for boys ($M = 51.60, SD = 15.69$).

Table 2
Differences by Creativity Measure

Measure	Boy ($n = 5$)		Girl ($n = 12$)		$t(15)$	p	Cohen's d
	M	SD	M	SD			
Fluency	9.00	2.35	8.42	3.82	.31	.76	0.17
Originality	4.40	3.21	4.17	2.41	.17	.87	0.09
TCT-DP	22.40	13.59	30.33	9.07	-1.42	.18	0.76
RIBS	51.60	15.69	75.17	19.77	-2.36	.03	1.26

In order to further understand the relationship between verbal and visual creativity, the technique of Multidimensional Scaling (MDS) was employed to evaluate overall measures of similarity. For this analysis, all four variables were included and an SPSS PROXSCAL executed to explore possible patterns. The two-dimensional perceptual map is shown in

Figure 1. Fluency and originality are most closely associated, to the point that they can be treated as one group. In terms of proximity, the other two variables (TCT-DP and RIBS) are widely separated from each other. Comparisons also can be made on dimension 1, which differentiates the fluency/originality group most clearly from TCT-DP in one direction and from RIBS in another direction. On dimension 2, TCT-DP can be seen as highly dissimilar from the other three variables. Although RIBS and fluency/originality are found in the same region on dimension 2, they are so far apart on dimension 1 that no similarity between them should be presumed.

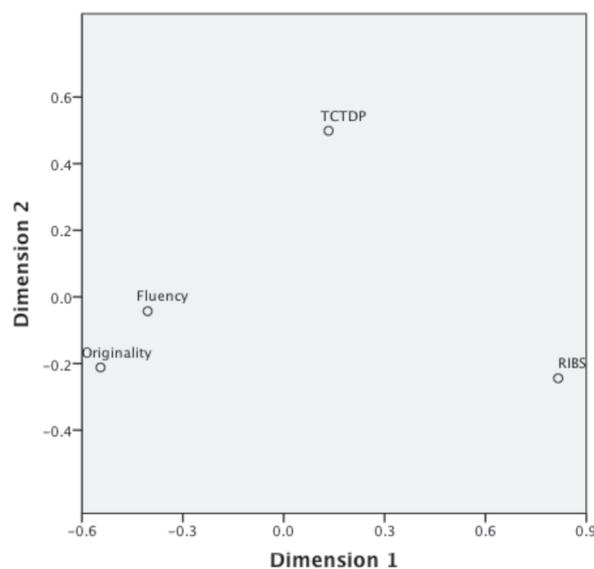


Figure 1. Perceptual map of the four variables.

With regard to the investigation of the possible existence of a moderator in the relationship between verbal and visual creativity, gender was tested and run through a multiple regression. Verbal creativity, for purposes of the current study, was scored as the sum of the scores for fluency and originality. A multiple linear regression was calculated predicting verbal

creativity based on visual creativity and gender. This was found to be not significant, $F(3, 13) = 2.62, p = .095$. As Table 3 shows, the only main effect was found for visual creativity on verbal

creativity and neither gender nor interaction was a significant predictor of verbal creativity. Thus, it would appear that gender is not a moderator between verbal and visual creativity.

Table 3
Regression Analysis Summary for Gender and Visual Creativity Predicting Verbal Creativity

Variable	<i>B</i>	<i>SE B</i>	β	<i>t</i>	<i>p</i>
Visual creativity	0.35	0.13	0.67	2.76	0.02
Gender	-3.24	2.82	-0.27	-1.51	0.27
Visual creativity x gender	0.53	1.23	0.10	0.43	0.68

Note. $R^2 = .38 (N = 17, p = .10)$.

Discussion

The results of zero-order correlation show that the relationship between visual creativity and verbal creativity in our sample was moderate, and only the relation between visual creativity and fluency was significant, while that between visual creativity and originality was not. When further investigating the relationship between verbal and visual creativity through the use of MDS, it became clear that on either dimension 1 or 2 of the perceptual map, the positions of verbal creativity and figural were remarkably distant from each other. This finding might suggest that verbal and figural creativity are distinct attributes, and more importantly, that they may rely on different domain-specific abilities. That the findings of the current study are similar to other studies (Dow & Mayer, 2004; Palmiero et al., 2010) would seem to lend support to the arguments for a domain-specific theory of creativity, but more research would be needed to move this idea beyond the realm of speculation.

Interestingly, a three-way relation between ideational and two types of creativity (verbal and figural) was weak and not significant. This finding contradicts that of Runco et al. (2000-2001), that “the most appropriate criterion for studying the predictive validity of divergent thinking tests is one that emphasizes ideation” (p. 394). Runco and his colleagues (Plucker, Runco, & Lim, 2006; Runco et al., 2000-2001) also argue that the main purpose of developing the RIBS is that it can serve as a criterion of creative potential, and perhaps even as an alternative measurement of divergent thinking. Nevertheless, neither the results of our correlation nor of MDS support this. Of course, the small sample size might have affected this finding, and it would therefore be strategically advisable to conduct more research to further validate the usefulness of the RIBS.

Finally, it would appear that gender is not a moderating variable between verbal and visual creativity, and is independent of both. In terms of gender difference, the results from our small

sample reveal no differences in verbal or visual creativity between boys and girls. However, the girls had a higher tendency toward ideational behavior, and this difference was quite sizeable. As previously mentioned, the RIBS is grounded in the notion of divergent thinking; as such, if girls have higher scores on the RIBS, they should also have higher scores for verbal creativity, and especially fluency. This is not the case, however, in the current study; rather, boys had higher mean scores of fluency and originality than girls did. This finding is intriguing. On the one hand, it might be related to issues with the RIBS; on the other, because of the clear limitations implied by both the smallness of the sample and the nature of a self-reporting instrument, it would be premature to make conclusions about the gender in relation to ideational behavior. At best, it can safely be argued that no gender difference was found in verbal and visual creative ability, which is similar to the results of other studies (Baer & Kaufman, 2008; Kogan, 1974).

In summary, this study had three major findings: first, that the relationship between verbal and visual creativity was moderate and significant, while the relationship between ideational behavior, on the one hand, and verbal creativity and visual creativity, on the other, was weak and non-significant. More centrally to this first point, bivariate correlation revealed, that figural creativity is more related to fluency than to originality. Second, as illustrated by our perceptual map, it appears that verbal and visual creativity are different constructs, which might tend to support the domain-specific theory of

creativity. Finally, gender did not function as a moderator between verbal and visual creativity.

A Caveat

For the sake of more precise interpretation of the findings, it is worth revisiting several limitations of the current study. First, because of small sampling in this exploratory study, it is hoped that utilizing a much larger pool of participants could resolve some of the questions raised by the current study. Second, to measure creative-thinking ability in this study, participants were asked to generate ideas and pictures presented to them. However, such assessments cannot reflect real-life creative achievement, and future researchers should consider using alternative approaches such as collage-making, poem-writing, and story-writing tasks (Bear, 1993). Finally, Taiwanese third and fourth graders were examined in this study, and whether similar findings would be found using samples from other cultures and age groups is unknown. Employing cross-cultural subjects would be a legitimate means of providing further evidence and a more complete picture of this topic. Although the findings on gender in this study were consistent with those of other studies, more comprehensive research is warranted if we are to understand the relationship of gender to verbal and visual creativity.

Conclusion

Under domain-general theory, creativity is viewed as a single ability that might be inculcat-

ed via a single training and approach. Domain-specific theory, on the other hand, breaks creativity down into coherent subcategories such as verbal, mathematical, and visual creative ability (Dow & Mayer, 2004). The results of the current study tend to favor the domain-specific theory, insofar as training in one type of creativity cannot automatically transfer to other types. For practitioners who encourage the development of creativity in children, it is important to employ different kinds of strategies that cater to various creative abilities. Of course, teaching students using a collection of general strategies is still worthwhile for practical purpose, but teachers should recognize the limitations placed upon them by the search for a one-size-fit-all approach. It is more plausible to use a range of different creativity-training approaches to maximize children's creative potential. After all, creativity has complex facets (Mumford & Gustafson, 1988).

Another important implication concerns the pedagogical value of bringing creativity into the classroom. The main issue is that is there still room for creativity in the Taiwanese classroom, especially under the pressure of high-stakes assessment. Although a number of scholars (Ho & Ho, 2008; Kim, Lee, Chae, Anderson, & Laurence, 2011; Ng, 2003; Ng & Smith, 2004) have criticized the impact of Confucian-Heritage Cultures on the development of creativity on students, Tsai (2013) has pointed out the bias in several arguments that Confucianism counteracts creativity. To be fair, as Kim (2005) points out, rigid hierarchical relationships, family systems,

benevolence, and traditional pedagogical approaches might stifle creativity under these core values of Confucianism. Nevertheless, the value placed on sufficient funding for K-12 education, self-discipline, persistence, and hard work as a path to achievement might be advantageous to the development of creative pedagogy. Thus, taken as a whole, it remains a promising movement to fostering creativity for Taiwanese children.

Based on our observations, unfortunately, the development of creativity remains undervalued in the Taiwanese educational system. Memorization, rote learning, and reasoning ability still play leading roles in most students' K-12 journey. Limited time, resources, and support make it problematic for teachers to include critical- and creative-thinking training in their curriculum. So the concern raised by teachers is: is it worth while to try to develop creativity in Taiwanese children? Many teachers might hesitate to make extra efforts to cultivate students' creativity because of the current educational framework in Taiwan. To attempt the teaching of creativity, however, is to encourage children to extrapolate learned knowledge from the classroom. As a consequence, planting the seeds of creativity in children's minds can not only facilitate their learning but also equip them to face future challenges. Children should be required to go beyond what they have learned in the school setting and extend the application of knowledge to an unknown situation. Creative thinking could serve as a key medium toward this goal.

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