

CREATIVITY AND INSIGHT: A STUDY OF CHINESE UNDERGRADUATES IN MACAU

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ABSTRACT: *Most studies treat insight as an important unconscious process geared toward the generation of creative solutions to problems, but ignore the fact that creativity can be manifested in at least two distinct forms: verbal and figural. The purpose of the current study, therefore, was to investigate the relationship between insight and verbal and figural creativity. Participants were 108 Chinese second-year undergraduates in Macau. The results indicated that no significant correlations were found between insight and verbal and figural creativity. The hierarchical regression was also nonsignificant, which suggests that verbal and figural creativity can not predict insight. Extreme caution, however, should be exercised in the interpretation of these results, due to several identified limitations.*

KEYWORDS: insight, creativity, Chinese students, verbal creativity, figural creativity.

INTRODUCTION

Insight has been defined as a rapid restructuring of existing mental structures, and one phase in the transformation of old information into new information (Csikszentmihalyi & Sawyer, 1995). Insight is often considered in terms of how it influences creative problem solving (Gruber, 1995; Shaw, 1989). While it does not often directly provide the creative solution to a problem, it can help people to problems from different viewpoints, thereby identifying key characteristics and new possible relationships (Hélie & Sun, 2010). Perkins (1995) thinks that “the insightful person must first build up a huge reservoir of discipline-relevant information” (p. 479). Insight’s level of usefulness as mechanism within the creative process is governed by the individual’s knowledge base as well as his/her innate level of creativity.

Simonton (1995) points out five typical features of insight: (a) it comes from a long search of the individual’s mental database; (b) its major function is to uncover the hidden; (c) it ought to be recognized as an achievement of understanding, and thus is generative; (d) it usually happens unexpectedly; and (e) it is achieved rapidly (pp. 498-499). Simonton regarded insight as an important source for idea generation and problem solving.

Hélie and Sun (2010) reviewed a number of theories of insight and assigned them to four major categories: (a) constraint theory, which argues that insight problems pertain to the satisfaction of constraints; (b) fixation theory, which also assumes insight problems involve the satisfaction of constraints, but holds that these constraints are not necessarily linked to the initial problem; (c) associationistic theory, in which the only difference between insight and noninsight solutions is the strength of the associations of ideas; and (d) evolutionary theory, which suggests that knowledge is represented by nodes and that associations are formed through an evolutionary selection principle (pp. 996-997).

Most studies treat insight as an important unconscious process geared toward the generation of creative solutions to problems. Insight-based problem solving is closely connected to that on divergent thinking (Perkins, 1995). For example, Lin, Hsu, Chen, and Wang (2012) examined the relationships between four measures of divergent thinking and insight problems and found that insight was significantly positively related to fluency and flexibility (from $r = .19$ to $r = .26$); however, insight was not significantly correlated to originality and elaboration.

Beaty, Nusbaum, and Silvia (2014) used four classic insight problems and two self-reported creative achievement as the index of creativity (CAQ; Carson, Peterson, & Higgins, 2005; BICB; Batey, 2007) and found no relationship between insight problem solving and self-reported creativity. These findings seem to contradict previous research and deserve more attention on clarifying the relationship between creativity and insight. As a result, in the current study we used another 10 insight problems and differentiated between verbal creativity and figural creativity. We explored whether the ability to solve insight problems translates into verbal and figural creativity. Based on prior research, we therefore hypothesized that

H1a: Insight is significantly associated with verbal creativity.

H1b: Insight is significantly associated with figural creativity.

In the current study we suggested that insight is correlated to verbal and figural creativity, in order to estimate the contribution of these two creativity indexes to insight, so we used verbal and figural creativity as independent variables and insight as a dependent variable. Thus, another hypothesis was proposed:

H2a: Verbal creativity can be used to predict insight.

H2b: Figural creativity can be used to predict insight.

The major purpose of the current study was to investigate the relationship between insight and creativity. More specifically, it attempted to establish the extent to which insight is related to figural and verbal creativity. The unique contribution of this study was to differentiate verbal and figural creativity, and it is hoped to clarify some discrepancies about the role of insight in creativity.

METHOD

Participants

The participants in this study were 108 Chinese second-year undergraduates (49 males and 59 females) studying art and design in Macau, and most were 20 years of age.

Instruments

Two measures of creativity and one insight task were employed in this study. These were: (a) a verbal creativity test, Wu's Chinese Version of the Torrance Tests of Creative Thinking (WCTTCT; Wu, 1998); (b) a figural creativity test, the Test for Creative Thinking – Drawing Production (TCT-DP; Jellen & Urban, 1986); and (c) an insight problem test (Lin, Hsu, Chen, & Wang, 2012).

Verbal creativity. The verbal form of WCTTCT was used in the present study to ask students to name all the uses for bamboo chopsticks. This task was similar to the Alternate Uses test (Wallach & Kogan, 1965), which was designed to measure flexibility of thinking within the context of an investigation of creative thinking. In the Alternate Uses test, the inspiration is a brick or newspaper, whereas in Wu's version, bamboo chopsticks were utilized especially to reflect Chinese contexts, and thereby better capture the creative potential of Chinese students. Chen, Jiang, and Hsu's (2005) reported inter-rater reliability (from $r = .79$ to $.98$) and test-retest reliability (from $r = .34$ to $.60$), indicating WCTTCT is an appropriate instrument.

In the present study, the scoring of creativity was guided by (Plucker, Runco, & Lim, 2006) with the emphasis on two components: originality and fluency. Also following Hocevar's (1979) suggestions, each response received either zero points or one point for originality, according to the frequency with which it occurred in the total sample of students; any response that was given by more than 5% of the sample scored zero points for originality. The other calculated score was fluency, defined as the number of answers generated.

Figural creativity. The Test for Creative Thinking—Drawing Production (TCT-DP; Jellen & Urban, 1986) was used to evaluate the participants' figural creativity. This instrument was designed to evaluate creative thinking via analysis of drawing production. Participants are given six fragments to encourage them to complete an imaginative or innovative drawing. In particular, the test 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. From the perspective of Gestalt theory, creative product reflects "the character of a gestalt composition or the coherence of an organization" (Urban & Jellen, 1986, p. 165). 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. Jellen and Urban (1986) reported the reliability of TCT-DP was from $.88$ to $.97$. Evidence bearing on the validity of this measure has been provided by Chae (2003).

Insight problem test. The 10-insight problem task for the current study was chosen from Lin et al.'s (2012) study, which was part of an insight-problems inventory web site at Indiana University (http://www.indiana.edu/~bobweb/r546/modules/creativity/creativity_tests/insight_problems.html). Participants were given 20 minutes to complete five verbal and five figural insight problems. The score was calculated as the number of correct answers of the 10 total insight problems. One example is that "How many cubic centimeters of dirt are in a hole 6 meters long, 2 meters wide, and one meter deep?" And the correct answer is that "zero" because there is no dirt in a hole. The verbal form of insight and figural form were scored separately to generate two indexes of insight.

Procedure

Students were first requested to provide their background information, including, age, sex, and educational level. They were then instructed to complete the three tests described above in the classroom. They were given five minutes to complete the verbal creativity task, 15 minutes for the insight problem task, and 10 minutes for the figure creativity test. As there were no breaks between the three tasks, each test session lasted 30 minutes.

RESULTS

In order to examine the relationship between the creativity variables (fluency, originality, and figural creativity) and insight problem solving, correlational analyses were run. Table 1 shows means, standard deviations, and intercorrelations on four variables. Results showed that The correlation between fluency and originality was positive and strong ($r = .87$), whereas the correlations between figural creativity, on the one hand, and fluency and originality were weak, $r = .23, .21$, respectively. Verbal and figural form of insight had no significant relationship with the other three variables (fluency, originality, and figural creativity). However, verbal form of insight was significantly correlated to figural form of insight, $r = .29$. These findings result in rejecting H1a and H1b.

Table 1

Means, Standard Deviations, and Intercorrelations on Four Measures

Measure	<i>M</i>	<i>SD</i>	1	2	3	4	5
1. Fluency	5.57	2.36	--				
2. Originality	3.12	1.92	.87**	--			
3. Figural creativity	21.70	11.86	.23*	.21*	--		
4. Verbal insight	1.62	1.14	.06	.06	.02	--	
5. Figural insight	2.38	1.22	.01	.10	.04	.29**	--

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

In addition, in order to understand whether verbal or figural creativity can predict insight, two linear regression were used to estimate the prediction of verbal and figural creativity to insight. For the first regression analysis, fluency, originality, and figural creativity were treated as predictors and verbal form of insight was viewed as dependent variable. The results show that in the model, fluency ($b = .004, \beta = .008, t = .039, p = .969$), originality ($b = .033, \beta = .056, t = .284, p = .777$), and figural creativity ($b = .000, \beta = .004, t = .038, p = .970$), indicating three variables were not valid predictors, which rejects H2a and H2b. In the second regression analysis, fluency, originality, and figural creativity were treated as predictors and figural form of insight was viewed as dependent variable. The results show that in the model, fluency ($b = -.176, \beta = -.341, t = -1.750, p = .083$), originality ($b = .249, \beta = .393, t = 2.03, p = .045$), and figural creativity ($b = .004, \beta = .035, t = .357, p = .722$), indicating three variables were not valid predictors, which rejects H2a and H2b.

DISCUSSION

The results of the correlational analysis and regression suggest that insight was not significantly related to figural or verbal creativity. The trivial correlation between insight and creativity was surprising, given that insight is viewed as an important incubator for creativity. However, such a finding is partially consistent with Beaty et al.'s (2014) study in that no relationship was found between insight and creativity, though that prior study's results were derived from self-reported creative achievement, whereas the current study used one divergent thinking test and a figural creativity measure.

In addition, Lin et al. (2012), from whom the insight task for the current study was adapted, found that insight was significantly correlated to fluency but not to originality (see their Table

1, p. 116). Nevertheless, the current study reveals a weak and non-significant connection between insight and fluency, originality, and figural creativity. Conceptually, creativity and insight are closely related (Hélie & Sun, 2010; Walinga, 2010), but the empirical results of the current study seem to reveal a very different picture.

Some possible factors might lead to these findings. First, when further examined for relationships between verbal and figural creativity, our data indicates that only fluency, and not originality, can predict figural creativity. The higher subjects scored for fluency, the better they tended to perform on figural creativity. It should be mentioned here that the regression weights were quite low and only 5% of variance can be explained in the regression model; therefore, the present study may only provide an exploratory direction. Second, despite their having been recruited from an academic program in art and design, our study participants' average TCT-DP figural creativity performance was notably lower than that found in other studies' samples (e.g., Cropley & Cropley, 2000; Dollinger, Urban, & James, 2004). More specifically, these Chinese undergraduates had similar reactions to some Gestalt fragments, a phenomenon also reported by Jellen and Urban (1989). For instance, the curve was commonly elaborated into a snake. As Jellen and Urban's observe, "stereotypical utilization of the various fragments became more culture-bound" (p. 84). Finally, a related issue pertains to the administrative settings: Wallach and Kogan (1965) have suggested that in administering these kinds of creativity tests, it is necessary to create a game-like environment that does not impose any time limits on the respondents. Although this is certainly a burden for researchers, it would be worthwhile to compare the impact of two different situations. Future research might also examine the affective impact of exposing individuals to creativity assessment.

LIMITATIONS AND IMPLICATIONS

The major limitation of the current study was the nature of the sample: as this consisted only of Chinese undergraduates whose field of study was intimately related to visual creativity, the generalizability of our findings is not guaranteed. Bigger sample size is needed to address this issue. In addition, the present research used two convenient measures to reflect visual and verbal creativity. Although the WCTTCT and TCT-DP assessments have been supported as being valid measures of creative potential (Chen et al., 2005; Sayed & Mohamed, 2013), future study should attempt to employ real-life creative performance – e.g., creating artworks and stories or poems – to present visual and verbal creativity, respectively. Finally, the current study was a correlational design; therefore, it is lack of power of further providing causality between insight and creativity. Using Quasi-experimental or experimental design should be considered for the future researchers.

CONCLUSION

The findings of the current study suggest that insight and creativity are not related. After conducting two studies, Beaty et al. (2014) found null effect of insight on creativity, and therefore questioned the supposedly important role that insight plays in the creative process. Going one step further, they commented that, "if insight is unrelated to creative achievement, the notion that unconscious processes contribute to creativity seems somewhat problematic" (p. 291). Extreme caution, however, should be exercised in the interpretation of these results, and it is suggested that much more work is needed in this area. Future researchers should

consider alternative criteria, and/or employ multiple cultural groups, to lessen the distortion that may be caused by confounding factors.

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