

Creative Self-Efficacy as a Predictor of the Use of Creative Cognition

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Abstract

The present study examined the hypothesized predictive role of creative self-efficacy in the use of creative cognition by taking a perspective rooted in social cognitive theory. A sample of 614 undergraduate students (51.6% female) in Hong Kong was surveyed using the Creative Self-efficacy Scale and the Use of Creative Cognition Scale. The results of multiple regression analyses indicated that creative self-efficacy significantly accounted for 11% of the variance in the tendency to deploy creative cognition. The results of Pearson correlation analysis suggested that the strength of the association between creative self-efficacy and the tendency to deploy creative cognition was of medium size ($r = .45$). These findings lend empirical support to social cognitive theory and the creative behavior as agentic action (CBAA) model. The findings also suggest the practical implication that creative intention can be facilitated through the promotion of a stronger sense of creative self-belief.

Keywords: creativity, creative self-efficacy, creative self-belief, use of creative cognition, social cognitive theory, creative behaviour as agentic action model

1. Introduction

The field of creativity studies has witnessed intensifying research focus on creative self-efficacy in recent years (Karwowski, Lebuda, & Beghetto, 2019; Li, Yang, Lin, & Xu, 2021), which is understood as the belief that one has the ability to produce creative outcomes (Tierney & Farmer, 2002). A research question of interest is whether people genuinely become more creative when they hold a stronger sense of creative self-efficacy (Pretz & McCollum, 2014). Previous research has supported the link between creative self-efficacy and several aspects of creativity (e.g., creative person, creative process, and creative product; see Haase, Hoff, Hanel, & Innes-Ker, 2018; He & Wong, 2021). The present study aims to extend this line of research to an alternative creativity construct (i.e., the *use of creative cognition*), which refers to the tendency to deploy creative ability (Miller, 2014; Rogaten & Moneta, 2015a, 2015b, 2016). Specifically, we aim to examine the hypothesized predictive role of creative self-efficacy in the use of creative cognition by taking a perspective rooted in social cognitive theory (Bandura, 1997, 2001).

1.1 Theoretical Perspective

The concept of creative self-efficacy has its theoretical roots in Bandura's theory of self-efficacy (i.e., social cognitive theory; Bandura, 1997, 2001), which refers to an individual's belief in his or her ability to produce designated levels of performance in specific situations or on particular tasks. Creative self-efficacy represents a particular type of self-efficacy that focuses on personal belief in relation to creative functioning (e.g., Tierney & Farmer, 2002). Some researchers have highlighted creative self-efficacy as an individual's self-confidence in his or her creative ability (e.g., imaginative ability, self-perception in the competence of generating new and useful ideas, behaviors, and solutions to problems; Beghetto, Kaufman, Baxter, 2011). Other researchers have emphasized creative self-efficacy as one's belief in his or her ability to solve creative problems and function creatively (Karwowski & Barbot, 2016).

According to social cognitive theory, a good level of self-efficacy is a necessary (though not sufficient) condition for creative productivity (Bandura, 1997, 2001). In Bandura's words, "innovativeness largely involves restructuring and synthesizing knowledge into new ways of thinking and of doing things... an unshakable sense of efficacy (is required) to persist in creative endeavors" (1997; p. 239). Bandura (2001) noted that people do not put time, resources, and effort into creative activities unless they believe that they can produce creative outcomes. Extending Bandura's (1997, 2001) idea to creative self-efficacy, Tierney and Farmer (2002) contended that

creative self-efficacy facilitates creative outcomes through a series of actions such as (1) attempting a creative task, (2) affording effort in the creative process, and (3) maintaining persistence in the face of difficulties (see also Du, Li, & Zhang, 2018). Similarly, Karwowski and colleagues (Karwowski & Beghetto, 2019; Karwowski et al., 2019) recently proposed a theoretical model, namely, the creative behavior as agentic action (CBAA) model, to contend that an individual's intentional actions are largely influenced by his or her belief system, which subsequently influences the occurrence of creative behaviors. Similar to social cognitive theory, the CBAA model also stresses that an individual may not demonstrate a particular creative behavior despite his or her capability of performing that behavior unless the person holds the belief that he or she is able to do so.

1.2 Empirical Findings

In the past decade, growing research attention has been given to the role of creative self-efficacy in creativity (Li et al., 2021). Most empirical studies have documented a positive link between creative self-efficacy beliefs and various aspects of creativity, such as a creative person (Seo, Chae, & Lee, 2015), creative process (Li et al., 2021), and innovative product (Puente-Díaz, 2016). A positive link has been found in studies using different types of creativity measures, such as standardized creativity tests (Puente-Díaz & Cavazos-Arroyo, 2016), teacher evaluations (Beghetto et al., 2011), supervisor evaluations (Tierney & Farmer, 2011), and self-rated creativity (Pretz & McCollum, 2014). A positive link has also been found in studies involving both employee (Tierney & Farmer, 2011) and student samples (Puozzo & Audrin, 2021). In summary, accumulating research evidence has supported the positive role of creative self-efficacy in creativity (although mixed findings exist, e.g., Simmons, Payne, & Pariyothorn, 2014). Furthermore, a meta-analysis based on 41 empirical studies regarding the link between creative self-efficacy and creativity found that the overall mean of the strength of associations was of medium size ($r = .39$; Haase et al., 2018).

1.3 The Present Study

While researchers have studied the link between creative self-efficacy and creativity with regard to various aspects, such as a creative person, creative process, and creative product (Haase et al., 2018; He & Wong, 2021), the current study aims to extend this line of research to an alternative creativity construct (i.e., the use of creative cognition), which is an underresearched area in studies of the efficacy-creativity link (Rogaten & Moneta, 2016). The concept of the use of creative cognition originates from the creative cognition approach (Finke, Ward, & Smith, 1992; Ward, Smith, & Finke, 1999), which holds that creativity is a multifaceted construct that emerges from multiple cognitive processes (Ward, 2007; see also Miller, 2014). Bandura (1997) held the similar view that "creativity requires a good deal of cognitive facility to override established ways of thinking that impede exploration of novel ideas and search for new knowledge" (p. 239). Based on the creative cognition approach, researchers have identified a range of cognitive processes that are likely related to creativity, including divergent and convergent thinking, analogical and metaphorical thinking, perspective-taking, imagery, and incubation, which are collectively labeled creative cognition (Davis, 2004; Miller, 2014; Rogaten & Moneta, 2015a, 2016).

Notably, the creative cognition approach focuses on understanding individuals' tendency or willingness to deploy their creative ability (or the use of creative cognition; Miller, 2014; Rogaten & Moneta, 2015a, 2015b, 2016) but not their creative ability *per se*. It is emphasized that a person's tendency to use creative ability is not equivalent to his or her actual creative ability (Miller, 2014). These two concepts are related but distinct from each other (Csikszentmihalyi, 1997; Rogaten & Moneta, 2015a). While a certain level of creative ability is needed to deploy creative ability, some people who have high creative ability do not typically use this ability, whereas other people with low creative ability do so (Rogaten & Moneta, 2016). In this aspect, the perspective based on social cognitive theory (Bandura, 1997; Karwowski & Beghetto, 2019; Karwowski et al., 2019) offers an insightful account with respect to the predictive role of creative self-efficacy in the tendency to deploy creative cognition. Individuals with high creative self-efficacy likely tend to deploy creative cognition and vice versa. While many studies have established a link between creative self-efficacy and creative ability (see Haase et al., 2018; He & Wong, 2021), limited empirical research has been conducted regarding the role of creative self-efficacy in the use of creative ability. In the present investigation, we empirically examine the hypothesized link between creative self-efficacy and the use of creative cognition.

2. Method

2.1 Participants and Procedure

A total of 614 (48.4% male) undergraduate students from three universities in Hong Kong were invited to take part in the study. All participants provided written informed consent, and the participation in the study was entirely voluntary. All participants were ethnic Chinese. The age range of the sample was 18-25 years ($Mean\ age = 21.6$;

$SD = 1.78$). Standard instructions were given to the participants to complete the measures on creative self-efficacy and the use of creative cognition. The study was conducted in a group setting with approximately 20-25 participants being tested at a time. See Table 1 for a summary of the means and SD s of the demographic variables and the scores of creative self-efficacy and the use of creative cognition.

2.2 Instruments

2.2.1 Creative Self-Efficacy

The Chinese version of the Creative Self-Efficacy scale (the CSE scale; He & Wong, 2021; Karwowski, 2012, 2014, 2016) was employed to assess participants' self-belief regarding their creativity. The test consists of six items. Participants response on a 5-point Likert-type scale ranging from 1 (definitely not) to 5 (definitely yes) to indicate the extent to which they agree or disagree with the statements. Sample test items include "I trust my creative abilities" and "I am sure I can deal with problems requiring creative thinking". Since its introduction, the CSE scale has attracted intensive research attention, and empirical evidence has supported its reliability and validity (e.g., Karwowski, 2012, 2014, 2016; Royston & Reiter-Palmon, 2019; Yang, Xu, Liu, & Pang, 2020). The applicability of the Chinese version of the test has been supported in a student sample in Hong Kong, with construct validity supported by the results of confirmatory factor analysis (CFA) and reliability supported by high internal consistency ($\alpha = .83$; He & Wong, 2021). A Cronbach's $\alpha = .85$ was obtained in the present study, supporting good internal consistency of the scale.

2.2.2 Use of Creative Cognition

The Use of Creative Cognition Scale (UCCS; Rogaten & Moneta, 2015a) was adapted and translated into a Chinese version using a back-translation procedure to assess the tendency to deploy creative cognition. Table 2 presents the English and Chinese versions of the test, which consisted of five items. The response to each statement was rated with a 6-point Likert scale ranging from 1 (never) to 6 (always). The scale has been shown to have good construct validity based on the results of CFA (Rogaten & Moneta, 2015a). Its concurrent validity has also been supported by the results of positive correlations with cognitive processes and personality traits that are important to creativity (Rogaten & Moneta, 2015a, 2015b). Past studies support the reliability of the scale by showing high internal consistency ranging from $\alpha = .82$ (Rogaten & Moneta, 2015a) to $\alpha = .89$ (Rogaten & Moneta, 2015b). Good internal consistency ($\alpha = .84$) was also obtained in the present study.

Table 1. Means, standard deviations, and correlation coefficients of the study variables

	1	2	3	4	5	6
1. Gender ^a	1.00					
2. Age	.027	1.00				
3. Education	.008	.641***	1.00			
4. GPA	.011	.026	.014	1.00		
5. CSE	.189**	.018	.008	.175**	1.00	
6. UCCS	.184**	.013	.011	.162**	.448***	1.00
Mean	--	21.6	16.9	3.02	3.07	3.64
SD	--	1.78	1.83	0.48	0.96	0.71

Note. ^a1= M, 0 = F; CSE = Creative self-efficacy; UCCS = The use of creative cognition scale; ** $p < .01$; *** $p < .001$.

3. Results

3.1 Confirmatory Factor Analysis

As this is the first study to apply the UCCS in a Chinese sample, it is essential to examine the construct validity of the scale prior to hypothesis testing. The confirmatory factor analysis (CFA) was performed with five indicators loading on one factor. The results of the resulting model ($CFI = .96$, $TLI = .97$, $SRMR = .038$, $RMSEA = .58$) suggest that the model fit was acceptable despite the chi-square value was statistically significant ($\chi^2 = 96.51$, $df = 5$, $p < .001$). The standardized factor loadings are presented in Table 2 and range between .608 and .781. These results are similar to those reported in Rogaten and Moneta (2015a, 2015b), which support a unidimensional factor structure of the scale.

Table 2. Chinese translation of the UCCS items and the standardized factor loadings of the indicators

Item	Factor load
1. I find effective solutions by combining multiple ideas. 我會用結合多種想法的方式以尋求有效的問題解決方案。	.702
2. While working on something, I try to generate as many as ideas as possible. 在做一件事情的時候，我會嘗試盡可能想出很多意念。	.781
3. I try to act out potential solutions to explore their effectiveness. 我會嘗試將可能的解決方案付諸實踐，以探索其有效性。	.696
4. If I get stuck on a problem, I try to take a different perspective of the situation. 如果我在某個問題上陷入困境，我會嘗試用不同的角度去思考該境況。	.743
5. Incorporating previous solutions in new ways leads to good ideas. 以新的方式結合曾經用過的解決方案會產生好的主意。	.608

3.2 The Relationship between Creative Self-Efficacy and the Use of Creative Cognition

To test the hypothesized predictive role of creative self-efficacy in the use of creative cognition, multiple regression analyses were performed following Pearson correlation analysis. The Pearson correlation coefficient statistics shown in Table 1 indicate that the use of creative cognition was significantly correlated with gender, GPA and creative self-efficacy ($r = .16-.45, ps < .01$). Concerning the predictive role of creative self-efficacy in the use of creative cognition, hierarchical multiple regression analyses were performed using creative cognition as the criterion and creative self-efficacy as the predictor. The demographic variables (i.e., gender, age, education, GPA) were entered in Block 1 to control for their possible covariate effects. The predicting variable (i.e., creative self-efficacy) was then entered in Block 2 to test its predictive power for the use of creative cognition. The results show that the demographic variables explained approximately 5% of the variance in the use of creative cognition ($R^2 = .05, F(4, 609) = 9.77, p < .001$). Creative self-efficacy accounted for an additional 11% of the variance in the use of creative cognition ($\Delta R^2 = .11, \Delta F(1, 608) = 76.82, p < .001$). As shown in Table 3, participants who showed firmer creative self-efficacy beliefs demonstrated a higher tendency to deploy creative cognition ($B = 0.62, SE = .05, \beta = .43, p < .001$). These results support the hypothesis regarding the predictive role of creative self-efficacy in the use of creative cognition.

Table 3. Results of hierarchical regression analyses predicting the use of creative cognition

	Predicting the use of creative cognition		
	<i>B</i>	<i>SE</i>	β
Step 1			
Gender ^a	0.38	0.08	.19**
Age	0.03	0.03	.04
Education	0.02	0.05	.02
GPA	0.79	0.19	.16**
Step 2			
Creative self-efficacy	0.62	0.05	.43***

Note. ^a1 = Male, 0 = Female; ** $p < .01$; *** $p < .001$.

4. Discussion

The relationship between creative self-efficacy and creativity has gained momentum in the last decade (Haase et al., 2018). While creative self-efficacy refers to a person's beliefs in his or her creative functioning (Karwowski, 2011), it is essential to explore whether people truly become more creative when they hold a stronger sense of creative self-efficacy (Pretz & McCollum, 2014). Adding to many past studies that have established a link between creative self-efficacy and several aspects of creativity (e.g., creative person, creative process, and creative product; see Haase et al., 2018; He & Wong, 2021), the present study found that creative self-efficacy significantly

predicted the tendency to deploy one's creative ability in a positive way. Specifically, our data suggest that creative self-efficacy accounted for 11% of the variance in the tendency to use creative ability after controlling for the effect of demographic variables.

The findings of a positive predictive role of creative self-efficacy in the tendency to deploy creative ability enrich scientific understanding of the efficacy-creativity link in light of the multifaced construct of creativity (Sternberg & Lubart, 1999). Previous studies have focused primarily on the role of creative self-efficacy in creative ability and outcomes (see Haase et al., 2018; He & Wong, 2021). Our findings enrich this line of research by illustrating the positive role of creative self-efficacy in the intention to deploy creative ability. As highlighted in the introductory section, creative ability and the intention to deploy creative ability are related but distinct constructs (Rogaten & Moneta, 2015a, 2015b, 2016). Our findings corroborate many past studies (e.g., Li et al., 2021; Puente-Díaz, 2016) and lend support to social cognitive theory, which contends that a good level of self-efficacy is necessary for creative productivity (Bandura, 1997, 2001). Our findings specifically lend empirical support to the CBAA model (Karwowski & Beghetto, 2019; Karwowski et al., 2019), which focuses on the influence of a person's belief system on his or her intention to act. It emphasizes that an individual's intention to act is largely influenced by the expectancy effect. Expectations of creative outcomes translate into willingness to use creative ability, which in turn may lead to actual creative results.

Our data demonstrated that the strength of the association between creative self-efficacy and the tendency to deploy creative ability ($r = .45$) was of medium size. This finding is interesting when referring to the results of Haase et al.'s (2018) meta-analysis, which revealed that the strengths of associations were related to the measurement used to assess creativity. Specifically, studies that have measured creativity with self-rated questionnaires/scales showed a stronger association ($r = .43$) than those that used objective measures, such as creative thinking tests or creative performance tests ($r = .19-.27$). With regard to the aspects of creativity (i.e., person, process, product) that were assessed, creativity measurements involving the creative person show a higher statistical relation to creative self-efficacy ($r = .47$) than those that measure creative products ($r = .32$) or creative processes ($r = .27$). In this study, the UCCS was used to assess the participants' willingness to deploy creative ability, which is a self-reported creativity measure. In previous studies, the UCCS was shown to correlate positively with several self-reported measures that aim to assess personal characteristics such as trait intrinsic motivation, positive affect, and adaptive metacognitive traits (see Rogaten & Moneta, 2015a). These findings may imply that the UCCS is more similar to creativity measures that aim to assess the characteristics of a creative person than those that aim to assess the characteristics of the creative process or creative outcomes.

Despite the data collected in the current study tend to our hypothesis, several issues related to the limitations of the study should be discussed, and future research directions should be considered. The first limitation concerns the relational design of the study, which may limit the direction of causality. Intervention studies can be used in future studies that aim to verify the cause-effect relationship between creative self-efficacy and the tendency to use creative ability (see Puozzo & Audrin, 2021). Notably, the relationship between creative self-efficacy and creativity can be bidirectional but is not just a one-way prediction. As it was highlighted by the social cognitive theory that personal experience can influence self-efficacy (Bandura, 1997, 2001). As such, outcomes of creative behaviors can be regarded as a type of personal experience that may influence one's creative self-efficacy. Indeed, a recent longitudinal study (Karwowski & Beghetto, 2019) revealed that creative self-beliefs predicted creative achievement and were also influenced by subsequent creative achievement. Hence, future research using a longitudinal design can be considered to verify the bidirectional relationship between creative self-efficacy and the tendency to use creative ability.

The second concern involves the measurement issue. We only used students' self-reports by using the CSE scale and the UCCS to measure creative self-efficacy and the tendency to use creative ability. Self-report measures could potentially lead to common method bias and response motive bias in relation to subjective indicators (Puente-Díaz, 2016). Future studies should collect data from multiples sources (e.g., objective indicators, behavioural indicators, performance indicators) to measure participants' creative ability and their tendency to deploy creative ability. The final issue concerns the study sample. This study consisted of only a student sample from Hong Kong universities. The participants had a limited age range of 18-25 years and homogeneous characteristics with regard to educational background and ethnicity. The data obtained in this study showed that Chinese students reported a lower CSE score (i.e., 3.09) than those reported in Western studies (e.g., 4.09 in a college student sample in the US, Puente-Díaz & Cavazos-Arroyo, 2016; 3.51 in a high school student sample in Poland, Karwowski, 2012). Chinese students also reported a lower UCCS score (i.e., 3.07) than those reported in Western studies (e.g., 3.70-3.76 in university student samples in the UK, Rogaten & Moneta, 2015a, 2015b). It would be interesting to further explore whether present study's findings can be generalized to participants of different age groups and with

diversified ethnic and educational backgrounds.

Despite the aforementioned limitations, this study enriches the research on the relationship between creative self-efficacy and creativity. Our results support a positive predictive role of creative self-efficacy in the tendency to deploy creative ability, and the strength of the association between the two constructs is of medium size ($r = .48$). These findings suggest that an individual's intention to perform creative actions can be facilitated by the expectancy effect with regard to positive creative outcomes. While the expectation of creative outcomes is a dynamic concept that can be influenced by both personal and environmental factors (Bandura, 1997, 2001; Karwowski & Barbot, 2016), the findings of the present study have important implications for creativity enhancement and suggest the possibility of facilitating creative outcomes by promoting the development of a stronger self-belief in creativity.

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Competing Interests Statement

The authors declare that there are no competing or potential conflicts of interest.

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