Creative thinking and doing scale (Gubenko, 2022)

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Introduction

The present study had two major objectives. First, to design an assessment tool in order to operationalize and validate creativity in the conceptual unity of creative thinking and doing (Gubenko, 2022; Gubenko & Houssemand, 2022a,b). Second, to evaluate the effectiveness of the intervention using a newly designed tool by measuring the dynamics of participants' creative confidence before and after the intervention.

Creative self-efficacy and self-perceptions of the creative process

Creative self-efficacy concerns a person's perceived confidence to creatively perform a given task, in a specific context, and at a particular level (Beghetto & Karwowski, 2017). Both theoretically and empirically, creative self-efficacy is closely related to the notions of creative meta-cognition and creative self-concept (Reiter-Palmon et al., 2012), which pertain to perceived confidence judgements and beliefs regarding expected creative performance.

Numerous psychometric instruments have been developed to measure creative self-efficacy, like 3-item creative self-efficacy measure (Tierney & Farmer, 2002), the short scale of creative self (Karwowski et al., 2018), 3-item creative self-efficacy scale (Beghetto, 2006), Runco Ideational Behavior Scale (Runco et al., 2001). Generally, researchers report a positive association between creative self-efficacy and actual creative performance (Haase et al., 2018; Farmer & Tierney, 2017). However, given that creativity has been associated with individual and predominantly mental process of generation of ideas and solutions, it inevitably affected how creative self-efficacy and associated constructs have been

operationalized. Therefore, along with accentuating the importance of creative ideation when designing a tool to measure creative self-efficacy we wanted to put an equal emphasis on the participants' perception of the efficiency of the practical side of the creative process concerned with active inquiry and experimentation with objects and materials. This rationale resulted in the development of two-dimensional 20-item scale evaluating individual confidence related to the efficacy of creative thinking and doing (Annex 1).

Sample

A sample of 68 students attending public high school in Luxembourg participated in this study (age range 19-21). Participants worked in small groups (max 6 persons). The post-training data of 1 participant was missing, the participant has thus been eliminated from statistical analyses.

Creative thinking and doing scale

For this project Gubenko (2022) has developed a scale aimed at measuring individual self-efficacy. The scale consisted of 20 questions measuring 2 dimensions: Creative thinking and creative doing. Each dimension comprised 10 questions. The instruction asked participants to read statements about their creative process and evaluate the extent to which each statement applied to their personal experience using 6-point Likert scale, ranging from *Strongly agree (1)* to *Strongly disagree (6)*. The instruction explicitly called participants to evaluate their best self without too much reflection and self-criticism.

Results

We have first checked the psychometric qualities of the new scale. Cronbach's alpha for the thinking sub-scale (items 1-10) was .88, for doing sub-scale (items 11-20) was. 88, and .93 for overall scale (items 1-20), suggesting high internal consistency of the two dimensions and the overall scale. High internal consistency has also been found for post-test data, where

alpha estimates of .94, .91, and .96 have been obtained for thinking, doing and overall scale correspondingly.

Test-retest reliability has been estimated using Pearson's correlation coefficient that was equal .73 ($p < .01$) for thinking and .62 ($p < .01$) for doing dimension correspondingly. Test-retest reliability for overall scale was .73 ($p < .01$), suggesting a moderately high consistency of creative self-perception across time.

To estimate the results of the intervention we have measured the dynamics of participants' creative confidence. To this end, we compared the mean confidence ratings given by participants on each dimension of the self-efficacy scale prior to and after the intervention. The results of paired samples t-test indicate that the intervention yielded in the improvement in participants' self-believes related to 'thinking' dimension of creativity, $t(66) = -7.1$, $p < .001$. The mean score of participants ideational confidence before the intervention was 38.0 ($SD = 7.2$) and 43.1 ($SD = 8.4$) after the intervention. Moreover, there was a significant increase in participants' self-beliefs related to practical side of the creative process ('doing' scale) after the intervention ($M = 44.6$, $SD = 7.6$) compared to the participants' self-beliefs before the intervention ($M = 39.4$, $SD = 7.0$), $t(65) = -6.7$, $p < .001$.

The results mean that the participants' self-perceptions of creative efficacy after the intervention were more positive than before the intervention, suggesting the potential of the intervention to improve individual creative confidence ratings. The intervention that we designed resulted in the significant improvement of individual confidence in the efficacy related to both dimensions of the participants' creative process.

Conclusions

We have provided details on the development and implementation of a theoretically-backed tool to evaluate the efficacy of the new training by measuring the dynamics of participants' creative confidence. Overall, the results of our study reveal that embodied and enactive training combined with ideational exercises may contribute to the participants' confidence performing creatively on a task and positively affect participants' perceptions of the efficacy of their creative behaviours.

We invested efforts in better comprehension and measuring creative confidence since participants' self-perceptions of creative process allow to tap to individual meta-cognitive judgements that combine individual self-knowledge (i.e., beliefs about one's creative strengths and weaknesses) with contextual information (i.e., the level of task difficulty or ambiguity) (Beghetto & Karwowski, 2017). The second reason of our empirical focus on creative self-beliefs as a target of intervention in this study is our intuition that the items of the scale containing descriptions featuring both embodied and mental processes underlying the creative performance may help participants to update their explicit knowledge about the main components of the creative process as well as to construct better implicit theories of creativity (Sternberg, 1985). It is possible, that knowledge and awareness of the role of both ideational and embodied cognitive processes may increase the accuracy of participants' creative self-concepts and self-evaluations made on the fly during the creative performance. Therefore, in our study we have tried to promote creativity by targeting not only actual performance and autonomous exploration of the tasks *(know how)* but also participants' reflections on one's creative process *(know what)*.

Possible applications and future use

The results of self-evaluations may provide useful and valuable information in educational, vocational, organizational, and therapeutic settings, especially with young people, whose creative self-concepts are in the process of development. In this sense, the scale may be a useful tool to track the dynamics of one's creative confidence in short- and long-term interventions. Additionally, the scale could be applied to conduct 360 degrees assessment to compare one's self-perceptions of creative efficacy with evaluations made by friends, teachers, or parents to discover eventual discrepancies of one's creative self-judgements.

While the calculation of the total score is theoretically possible, we recommend the use of two separate scores to obtain more accurate snapshot of an individual creative confidence. A comparison of the one's efficacy on each dimension may help to identify and examine one's self-efficacy related to creative ideation and creative doing and guide further reflections on one's creative cognition.

Annex 1

Creative thinking and doing scale (Gubenko, 2022)

Instruction

You will now read several statements about your creative process. Without being too reflective and self-critical, please evaluate the extent to which each statement applies to your personal experience. Try to think about your best self.

1	2	3	4	5	6
Strongly Disagree	Disagree	Rather Disagree	Rather Agree	Agree	Strongly Agree

1. I am good at generating new and original ideas
2. After some thinking I can come up with a lot of original ideas
3. Sometimes I can come up with ideas other people have never thought of
4. I enjoy mentally playing with ideas
5. I can combine ideas in ways others have not tried
6. I often create new ideas by combining existing ones
7. I try to see problems from different perspectives
8. I often use the technique of brainstorming to generate new ideas and solutions
9. I know how to generate new ideas
10. I am a person who has a lot of ideas
11. I enjoy playing and exploring materials
12. When I don't know how to do something I often start by trying
13. I like finding new ways of doing ordinary things
14. Experimentation is an important part of my creative process
15. Practical implementation of ideas is as important as idea generation

16. It is often in doing that I find new ideas and solutions
17. When I don't have necessary equipment to solve a problem, I often improvise with the objects that I have
18. I like to experiment with objects
19. I like doing things differently
20. I like to find new uses for common things

Creative self-efficacy score = average of 20 items

Instead of overall score we recommend to use 2 sub-scores:

1) creative thinking (items 1-10)
2) creative doing (items 11-20)

Scores for the discussion of the results of each dimension:

10-30 – low 31-50 – moderate 51-60 – high

References

Beghetto, R. A. (2006). Creative self-efficacy: Correlates in middle and secondary students. *Creativity research journal*, *18*(4), 447-457.

Beghetto, R. A., & Karwowski, M. (2017). Toward untangling creative self-beliefs. In *The creative self* (pp. 3-22). Academic Press.

Farmer, S.M., Tierney, P., 2017. Considering creative self-efficacy: its current state and ideas for future inquiry. In: *The Creative Self*. Elsevier, pp. 23–47. https://doi.org/10.1016/B978-0-12-809790-8.00002-9.

Gubenko A. (2022). The creative process in(between) humans and machines (Doctoral dissertation, University of Luxembourg).

Gubenko, A., & Houssemand, C. (2022a). Alternative Object Use in Adults and Children: Embodied Cognitive Bases of Creativity. *Frontiers in Psychology*, *13*.

Gubenko, A., and Houssemand, C. (2022b). Towards a framework for humanrobot co-creation. in Proceedings of Robophilosophy 2022. August 16-19, 2022.

Haase, J., Hoff, E. V., Hanel, P. H., & Innes-Ker, Å. (2018). A meta-analysis of the relation between creative self-efficacy and different creativity measurements. *Creativity Research Journal*, *30*(1), 1-16.

Karwowski, M., Lebuda, I., & Wiśniewska, E. (2018). Measuring creative self-efficacy and creative personal identity. *The International Journal of Creativity & Problem Solving, 28*(1), 45–57.

Runco, M. A., Plucker, J. A., & Lim, W. (2001). Development and psychometric integrity of a measure of ideational behavior. *Creativity Research Journal*, *13*(3-4), 393-400.

Reiter-Palmon, R., Robinson-Morral, E. J., Kaufman, J. C., & Santo, J. B. (2012). Evaluation of self-perceptions of creativity: Is it a useful criterion?. *Creativity Research Journal*, *24*(2-3), 107-114.

Sternberg, R.J. (1985). Implicit theories of intelligence, creativity, and wisdom. *Journal of Personality and Social Psychology*, 49, 607–627. https://doi.org/10.1037/0022-3514.49.3.607

Tierney, P., & Farmer, S. M. (2002). Creative self-efficacy: Its potential antecedents and relationship to creative performance. *Academy of Management journal*, *45*(6), 1137-1148.