

EDU WORLD 2018
The 8th International Conference

**TRAIT CURIOSITY AND CREATIVITY. COMMON BASES -
SIGNIFICANT DIFFERENCES**

Beatrice Adriana Balgiu (a)*

*Corresponding author

(a) University Politehnica of Bucharest, Splaiul Independenței, 313, sector 6, Bucuresti, România,
beatrice.balgiu@upb.ro

Abstract

The present article analyzes in three studies on undergraduates the relationship between trait curiosity (*Curiosity and Exploration Inventory-II - CEI-II*), and creativity conceived as: 1- divergent thinking (*Unusual Usages Creative Thinking test - UNU*), self-perceived creative capacity (*Scale for the self-perceived creative capacity - SPCC*) and 3, as creative self-concept (*Short Scale for Creative Self- SCS*). In the first study (N = 91), there was no relationship between curiosity and divergent thinking. The explanation of the results is related to the different construction of measures and conceptual differences in defining creativity. In the second study (N = 110), between curiosity and self-perceived creative capacity, moderate correlations were obtained. In the third study (N = 203), relationships between curiosity, its components, stretching and embracing and creative self-concept and the parameters that make it, creative self-efficacy and creative personal identity have been obtained. In this latter study, confirmatory factor analysis shows the existence of significant correlations between these last two measured constructs. Latent factor of Creative self-efficacy (CSE) correlated with the exploration of new experiences (Stretching, $r = .59$) and with the acceptance of uncertainty (Embracing, $r = .44$), while Creative personal identity (CPI) correlated with Stretching ($r = .45$) and slightly less with Embracing ($r = .37$). The conclusions of the investigation indicate the existence of a common basis of curiosity and CSE and CPI. Starting from these results, we conclude on the future modalities to measure students' potential in higher education.

© 2019 Published by Future Academy www.FutureAcademy.org.UK

Keywords: Curiosity, creativity, divergent thinking, creative self-efficacy, creative personal identity, self-perceived creative capacity.



1. Introduction

On an intuitive level, it was considered that curiosity is one of the impulses that trigger creativity, and it was defined as the intense desire to explore new and uncertain events (Kashdan et al., 2009) and the motivational desire to act and think in new ways (Kashdan & Silvia, 2009). According to Kashdan and Fincham (2002), “the emotional–motivational state of curiosity is associated with actively acquiring information to create, maintain, and/or resolve meaningful perceptual conflicts or gaps in knowledge” (p. 373).

2. Problem Statement

However, there are very few studies of the relationship between curiosity and creativity (Hardy, Ness, & Mecca, 2017). A first proof of the relation between curiosity and creativity results from the studies on the association of curiosity with the factor openness to experience in the Big Five Model. Thus, John and Srivastava (1999) used NEO-PI (60 items) and they reported on important correlations between openness and curiosity ($r = .51$) and the sub-factors of the latter, stretching – the motivation to look for new experiences ($r = .50$) and embracing – accepting uncertainty ($r = .43$). Within the theoretical frame of Big Five, curiosity is considered a lower order central facet of the dimension Openness (John & Srivastava, 1999). In the study in which they developed the curiosity measurement instrument, Curiosity and Exploration Inventory-II (CEI-II), Kashdan et al. (2009) found an important relation between curiosity and the dimension Openness to experience. The same study reports on the positive relation between curiosity, stretching and embracing, and another correlate of creativity, namely psychological flexibility, which is defined as the ability to be aware in the present moment and fully in contact with one’s thoughts and feelings without needless defence, and, the situation permitting, persisting or changing behavior in the pursuit of valued aims (Hayes, Luoma, Bond, Masuda, & Lillis, 2006).

Although the work of von Stumm, Hell and Chamoro-Premuzic (2011) does not deal with the relation between curiosity and creativity directly, it concludes that intellectual curiosity is the third pillar of the academic performance in addition to intelligence and conscientiousness. Another piece of evidence related to the association of curiosity with the creative personality comes from the studies carried out by Karwowski (2012, 2014, 2015) which clearly show the relation between curiosity (two of its subcomponents - stretching and embracing), and creative self-concept (CSC) and its parameters: Creative self-efficacy (CSE) – the individual’s belief regarding the capacity to solve a problem which needs creative thinking and functioning, and Creative personal identity (CPI) – the importance of creativity for self-identity, the individual’s belief that he/she is a creative person. Thus, a high CSE is considered to be a characteristic of eminent creators and it contributes to what is called high creativity (Big-C). In the case of low creativity (mini-c), CSE is usually treated as a general domain characteristic strongly related to creative functioning in general, rather than to the personal conviction of being creative in certain domains. The positive effects of CSE may be strengthened by the creative personal identity (*creative personal identity* - CPI) based on the individual’s experience and relation with other people, as well as with the opportunity to engage in creative activities. According to some authors, CPI may represent a stable identity construct, applicable in various situations and environments, and it is interpreted both as a notion of identity assessment (which describes how important it is to be creative) and as creativity assessment (Jausssi, Randel,

& Dionne, 2007). The studies showed the positive relation between CSE, CPI, divergent thinking, self-reported originality, and intrinsic motivation (Karwowski, 2012; Karwowski, Lebuda, Wisniewska, & Gralewski, 2013).

3. Research Questions

The general research question from which we started: what are the associations between curiosity and creativity measured from different perspectives?

Analysis strategies were conducted using SPSS Version 22 and Amos 20 to examine the descriptive, correlational statistics, and confirmatory factorial analysis.

4. Purpose of the Study

In the present study, we proposed to examine the pattern of the relation between curiosity and creativity, the latter measured by means of a divergent thinking test and scales of self-assessment of creativity as a creative potential and personality characteristic. We started from the hypothesis that one can obtain substantial correlations between curiosity, its dimensions, and creativity.

5. Research Methods

5.1. Study 1

Participants: We used a sample of 110 undergraduates (37 females) from a large public university (Mage = 18,93; S.D. = 0,66) recruited between 2017–2018

5.2. Measures

Curiosity and Exploration Inventory-II (CEI-II) (Kashdan et al., 2009) contains 10 items assessed on a scale from 1 – very little or not at all to 5 – to the highest extent, and it is structured around two subscales: *Stretching* or exploration – the motivation to look for knowledge and new experiences (e.g.: *I am at my best when doing something that is complex or challenging*) and *Embracing* – the willingness to embrace newness, uncertainty and the unpredictable nature of day-to-day life (e.g.: *I like to do things that are little frightening*). Summing scores for the two scales is the score for curiosity. The Cronbach alpha indexes reported by the authors in the three studies on the inventory validation vary from .78 to .80 for *Stretching*, from .83 to .85 for *Embracing*, and from .83 to .85 for the total score of the two subscales – total CEI (Kashdan et al., 2009).

The creative thinking test entitled “Unusual Usages” (UNU) elaborated and standardized by Stoica-Constantin & Caluschi (2006) on a Romanian population in order to measure potential creative thinking. The test consists in discovering as many usages as possible for an ordinary cane with a spike at the lower end. The test lasts for 5 minutes. Creativity is summarized by its three dimensions, fluency (the total number of ideas), flexibility (the passage from one category of items to another) and originality (calculated by checking every answer against the list of items evaluated by means of a scale from 0 (banal) to 13, where 13 is the minimum frequency of appearance, therefore, a high degree of originality. Finally, we add the originality scores for all the answers, thus, obtaining a score at this factor per test). The gross scores for the three dimensions are turned into a standard score on the progressive scale of 1 to 9. It is considered that the

test addresses the intellectual component of creativity and, at the same time, creative attitudes such as restructuring day-to-day life, focusing on risk, the sense of humor (the request to nameless ordinary usages urges the subject to do away with common, stereotypical images).

5.3. Results

Table 01 shows descriptive and correlational statistics. For the analyzed sample, curiosity has the following average values: $M = 34,69$ (S.D. = 6,16) for CEI-II total score; $M = 18,31$ (S.D. = 3,25) for Stretching and $M = 16,39$ (S.D. = 3,67) for Embracing.

Table 01. Descriptive and correlational statistics (** $p < .01$)

| Variables | M (S.D.) | 2 | 3 | 4 | 5 | 6 | 7 |
|----------------|--------------|-------|-------|------|-------|-------|-------|
| 1. Stretching | 18,31 (3,25) | .57** | .84** | -.10 | -.13 | -.08 | -.16 |
| 2. Embracing | 16,39 (6,37) | - | .88** | -.16 | -.14 | -.14 | -.21 |
| 3. Curiosity | 34,69 (6,16) | | - | -.17 | -.18 | -.14 | -.23 |
| 4. Fluency | 6,82 (1,94) | | | - | .95** | .81** | .98** |
| 5. Flexibility | 7,00 (2,18) | | | | - | .88** | .95** |
| 6. Originality | 5,80 (2,02) | | | | | - | .87** |
| 7. Creativity | 6,52 (1,94) | | | | | | - |

The comparison with other studies that used the respective scale shows results similar to that of undergraduate samples (Kashdan et al., 2009). In the case of creativity, the standard scores show supra-average values for fluidity, high values for flexibility, and average values for originality.

As one can notice (table 01), there is no relation between creativity measured with a test of divergent thinking and curiosity. The different construction of instruments accounts for the results. The test of divergent thinking entails the subjects' multiple reactions to verbal stimuli, while the inventory for the measurement of curiosity is a self-rating scale. On the other hand, it is highly probable that in a divergent thinking test other abilities are essential, namely those of a cognitive-affective type which are less strongly related to curiosity, such as imagination, the selectivity of thinking, the ingenuity of the association of distant elements, the variety of memory recalls.

5.4. Study 2

Participants: Data for this study comes from undergraduates students from the same public university ($N = 110$; 52 females; $Mage = 19.23$; S.D. = 0.87) selected over the period 2017-2018.

5.5. Measures

Curiosity was measured with the same instrument as in study 1. For the evaluation of creativity, the test below was used.

The *Scale for the self-perceived creative capacity* (SPCC) - Manmiller, Kumar, & Pekala (2005) measures the global creativity through self-reporting and it consists of two items: for example, *I consider myself a creative person* evaluated on a continuum of 1 – strongly agree to 5 – strongly disagree ($\alpha = .75$).

The evidence regarding the convergent validity of the scale is provided by certain studies (Manmiller, Kumar, & Pekala, 2005; Fuchs, Kumar, & Porter, 2007; Ceci & Kumar, 2016) which demonstrate that the latter correlates with other tests and questionnaires that evaluate creativity such as the Adjective Check List (Gough & Heilbrun, 1980), the Scale of Spontaneity (Kellar, Treadwell, Kumar, & Leach, 2002) and the Inventory of Emotional Creativity (Averill, 1999).

5.6. Results

We obtained significantly moderated correlations between self-perceived creativity (SPCC) and curiosity ($r = .34$), and its parameters, Stretching ($r = .24$) and Embracing ($r = .33$). Therefore, when individuals obtain high curiosity scores, they perceive their possibility of being creative in various situations. Certain authors show that this results from their belief that they will be able to control the situation and to handle the problems (Cervone & Peake, 1986).

5.7. Study 3

Participants: We used a sample of 203 undergraduates (60 females) from the same university (Mage = 19,30; S.D. = 1,19) recruited during the didactic activities in the first semester of 2018 academic year.

5.8. Measures

Curiosity was measured with the same instrument as in study 1 and 2. Creativity was measured from the perspective of the Creative Self-concept by using the test above.

The Short Scale for Creative Self – SSCS (Karwowski, 2012, 2014) was used to measure creative self-concept (11 items measured on a 5-point Likert scale where 1 = definitely not and 5 = definitely yes) in the composition of which interfere the scales: Creative self-efficacy (6 items; $\alpha = .81$, e.g. *I know I can efficiently solve even complicated problems*) and Creative personal identity (5 items; $\alpha = .90$, e.g. *My creativity is important to who I am*). A two-factor structure of this instrument was confirmed by structural equation modeling consists of confirmatory factor analyses (Karwowski, 2012, 2015; Karwowski et al., 2013).

6. Findings

The average values obtained in the case of curiosity are relatively similar to those in study 1: $M = 34,27$ (S.D. = 6,17) for curiosity total score; $M = 18,67$ (S.D. = 4,22) for Stretching and $M = 15,60$ (S.D. = 3,22) for Embracing (table 02). Female subjects obtained higher values in comparison with male subjects ($t = -1,65$; $p = .099$). For creativity, the averages are the following: Creative self-efficacy ($M = 3,71$), Creative personal identity ($M = 3,66$), and creative self ($M = 5,54$). No gender differences were obtained in this case. The comparison with a study of Polish subjects aged between 15 and 59 ($N = 2674$) show the slightly lower results both in CSE and CPI in the case of the present sample. The scales are characterized by moderate internal consistency (in the case of CEI-II; α Cronbach between .41 and .52) and high internal consistency (in the case of scale SSCS; α Cronbach between .77 and .87). (Table 02).

Table 02. Means, standard deviations and Cronbach indexes

| Variables | | M | S.D. | α |
|-----------|----------------------------|-------|------|----------|
| CEI-II | Stretching | 18,67 | 4,22 | .41 |
| | Embracing | 15,60 | 3,22 | .54 |
| | Curiosity | 34,27 | 6,17 | .52 |
| SSCS | Creative self-efficacy | 3,71 | .68 | .77 |
| | Creative personal identity | 3,66 | .78 | .82 |
| | Creative self-concept | 5,54 | .99 | .87 |

Correlations between latent higher-order factors of curiosity and creative self-were calculated. Structural equation modeling was used to better deal with the measurement error. To assess model fit, different indexes of fit were examined in confirmatory factor analysis (CFA) using Maximum Likelihood method: chi-square value, df, IFI (Incremental Fit Index), NFI (Normed-of-Fit Index), CFI (Comparative Fit Index), RMSEA (Root Mean Square Error of Approximation). The CFA (bootstrap = 2000) showed good fit: $\chi^2 = 255,600$; $df = 162$; $\chi^2/df = 1,57$; $IFI = .905$; $NFI = .774$; $CFI = .903$; $RMSEA = .055$ (table 3). Because this value is lower than .05, it indicates a good fit of the model (Browne & Cudeck, 1993). Latent factor of Creative self-efficacy correlated with the motivation to look for knowledge and new experiences (Stretching, $r = .59$) and with the acceptance of uncertainty (Embracing, $r = .44$), while Creative personal identity correlated with Stretching ($r = .45$) and slightly less with Embracing ($r = .37$). Both factors of the Creative self (CSE and CPI) are strongly correlated ($r = .86$). Similarly, there is a high correlation between Stretching and Embracing ($r = .75$).

Table 03. Summary of the confirmatory factor model

| Mode 1 | χ^2 | df | IFI | NFI | CFI | RMSEA |
|---------------|----------|-----|------|------|------|-------|
| Default model | 252,229 | 162 | .904 | .774 | .903 | .056 |

Per total, the results show a certain overlap between the dimensions of curiosity and creative-self, as well as differences. CSE correlates with both dimensions, Stretching and Embracing, much stronger than CPI does, and CPI is more strongly associated with the level of stretching than with the one of embracing. This suggests that both dimensions of curiosity are important for the belief of the person regarding his/her own creative abilities. The pattern relations between CSE, CPI and Stretching and Embracing is similar to the one obtained by Karwowski (2012) with the observation that in the mentioned study the common base of curiosity and creative self is much more obviously obtained by means of the hierarchical analysis carried out with two higher order correlated latent factors: curiosity and creative self.

7. Conclusion

Research considers that it is extremely necessary to clarify the role of curiosity in the development of creativity (Kashdan & Fincham, 2002). To this purpose, in the present study there were three sub-studies meant to capture the relation between curiosity and creativity measured by means of a test of divergent thinking, the self-assessment scale, and the scale for the creative self-concept - a surface characteristic of creative personality – with two dimensions, creative self-efficacy, and creative personal identity. There is

no relation between curiosity measured with the self-rating scale and creativity measured with a test of divergent thinking. The second study shows that, as curiosity is more and more developed, there is the possibility of getting involved in creative activity. In the third study, one can notice that there are certain overlaps, but also differences between the curiosity trait and its factors, on the one hand, and creative self-efficacy and creative personal identity, on the other hand. CSE correlates with both Stretching and Embracing much stronger than CPI does, while CPI is more strongly associated with the level of stretching than with the one of embracing. The general conclusion one can draw is that for a better understanding of the conditions of the manifestation of creativity it is important to study more variables. For the diagnosis of related psychological variables, such as curiosity, creativity, or divergent thinking, one needs to use a large battery of tests. Like any study, it also has limits. One of the limitations is the sample of students obtained from only one university. In addition to the moderate sample sizes, another limit is the character of the instruments used, the two scales used are of the short scale category with 10 items (CEI-II) and 11 items (SSCS), respectively.

References

- Averill, R. J. (1999). Individual differences in emotional creativity: Structure and correlates. *Journal of Personality*, 67(2), 342–371.
- Browne, M.W. & Cudeck, R. (1993). Alternative ways of assessing model fit, In Bollen, K.A. & Long, J.S. (Eds.), *Testing structural equation models*, Newbury Park, CA, Sage.
- Ceci, M.V., & Kumar, V. K. (2016). A correlational study of creativity, happiness, motivation and stress from creative pursuits, *Journal of Happiness Studies*, 17(2), 609–626,
- Cervone, D., & Peake, P.K. (1986). Anchoring, efficacy, and action: The influence of judgmental heuristics on self-efficacy judgments and behavior. *Journal of Personality and Social Psychology*, 50(3), 492–501.
- Fuchs, G. L., Kumar, V. K., & Porter, J. (2007). Emotional Creativity, alexithymia, and styles of creativity, *Creativity Research Journal*, 19(2-3), 233–245,
- Gough, H. G. & Heilbrun, A. B. (1980). *The Adjective Check List Manual* (2nd ed.). Palo Alto, CA, Consulting Psychologists Press.
- Hardy, J. H., Ness, A. M. & Mecca, J. (2017). Outside the box: Epistemic curiosity as a predictor of creative problem solving and creative performance, *Personality and Individual Differences*, 104, 230–237.
- Hayes, S. C., Luoma, J., Bond, F., Masuda, A. & Lillis, J. (2006). Acceptance and commitment therapy: Model, processes, and outcomes. *Behaviour Research and Therapy*, 44, 1–25.
- Jaussi, K. S., Randel, A. E. & Dionne, S. D. (2007). I am, I think I can, and I do: The role of personal identity, self-efficacy, and cross-application of experiences in creativity at work. *Creativity Research Journal*, 19, 247–258.
- John, O. P. & Srivastava, S. (1999). The Big Five trait taxonomy: History, measurement, and theoretical perspectives. In L. A. Pervin & O. P. John (Eds.), *Handbook of personality: Theory and research* (2nd ed., pp. 102–138). New York, Guilford.
- Karwowski, M. (2012). Did curiosity kill the cat? Relationship between trait curiosity, creative self-efficacy and creative personal identity. *Europe's Journal of Psychology*, 8(4), 547–558.
- Karwowski, M. (2014). Creative mindset: Measurement, correlates, consequences. *Psychology of Aesthetics, Creativity, and the Arts*, 8(1), 62-70.
- Karwowski, M. (2015). Development of the Creative Self-Concept, *Creativity.Theories – Research – Applications*, 2(2), 165–179.
- Karwowski, M., Lebuda, I., & Wiśniewska, E. (2012). Measurement of creative self-efficacy and creative role-identity. *High Ability Studies*.

- Karwowski, M., Lebuda, I., Wisniewska, E., & Gralewski, J. (2013). Big Five personality factors as the predictors of creative self-efficacy and creative personal identity: Does gender matter? *Journal of Creative Behavior*, 47(3), 215–232.
- Kashdan, T. B., & Fincham, F. D. (2002). Facilitating Creativity by Regulating Curiosity, *American Psychologist*, 5, 373–374.
- Kashdan, T. B., & Silvia, P. (2009). Curiosity and interest: the benefits of thriving on novelty and challenge, In C. R. Snyder, S. J. Lopez (Eds.), *Oxford Handbook of Positive Psychology*, Oxford University Press, (2nd ed.), 367–374.
- Kashdan, T.B., Gallagher, M.W., Silvia, P.J., Winterstein, B.P., Breen, W.E., Terhar, D. & Steger, M.F. (2009). The Curiosity and Exploration Inventory-II: Development, factor structure, and initial psychometrics. *Journal of Research in Personality*, 43(6), 987–998.
- Kellar, H., Treadwell, H. T., Kumar, V. K., & Leach, S. E. (2002), The Personal Attitude Scale–II: A revised measure of spontaneity. *Group Psychotherapy Psychodrama & Sociometry*, 55, 35–46.
- Manmiller, J., Kumar, V. K. & Pekala, R. J. (2005). Hypnotizability, creativity styles, absorption, and phenomenological experience during hypnosis. *Creativity Research Journal*, 17, 9–24.
- Stoica-Constantin, A. & Caluschi, M. (2006). *Evaluareacreativității. Ghidpractic*, [Evaluation of creativity. Practical guide], Iași: Editura Performantica.
- von Stumm, S., Hell, B. & Chamoro-Premuzic, T. (2011). The hungry mind: intellectual curiosity is the third pillar of academic performance, *Perspectives on Psychological Science*, 6(6), 574–588.