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Did Curiosity Kill the Cat? Relationship Between Trait Curiosity, Creative Self-Efficacy and Creative Personal Identity

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Abstract

The main objective of the study presented in this article was to examine the relationship between trait curiosity and two self-concept constructs which are gaining popularity in the creativity literature – creative self-efficacy (CSE) and creative personal identity (CPI). Although the role of curiosity in creativity seems well established, in fact there is little empirical evidence of the relationship between curiosity treated as a trait and both CSE and CPI. In a study conducted on a sample of middle and high school Polish students (N = 284; 55% female, aged 13–18, M = 14.74, SD = 1.14), curiosity was measured by the Curiosity and Exploration Inventory (CEI-II; Kashdan, Gallagher, Silvia, Winterstein, Breen, Terhar, & Steger, 2009) and CSE and CPI by the Short Scale of Creative Self (SSCS; Karwowski, Lebuda, & Wiśniewska, in press). Confirmatory factor analysis revealed the existence of substantial correlations between measured constructs. Latent factor of CSE correlated strongly with a tendency to seek out new experiences (stretching, r = .72) and an acceptance of unpredictability (embracing, r = .67), while CPI correlated substantially with stretching (r = .62) and slightly less with embracing (r = .48) – all correlations were highly reliable (p < .001). Hierarchical confirmatory factor analysis showed the existence of a strong relationship between the higher-order factor of curiosity (composed of stretching and embracing) and creative self (composed of CSE and CPI): r = .75, which may indicate common basis of creativity and curiosity. The consequences of curiosity for the development of CSE and CPI are discussed.

Keywords: curiosity, creative self-efficacy, creative personal identity, creative self, stretching, embracing

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Although anecdotal evidence confirms that curiosity is one of the most natural characteristics of creative individuals (Schmidhuber, 2006), there is far less empirical evidence that this is indeed the case. Empirical studies of the relationship between little-c creativity (Kaufman & Beghetto, 2009) – understood as a potential rather than creative achievements – and curiosity are rare. Although it has been demonstrated that creative content science TV programs positively influence children's curiosity (Rubenstein, 2000) and that curiosity may be positively connected with so-called "General Restrained Creativity" and "Impulsive Creativity", it was also found that low curious people achieve higher scores on the "Concrete Creativity" factor (Maw & Maw, 1970). In the past it has also been argued that curiosity and intelligence are factors which are responsible for translating creative abilities into accomplishments (Day & Langevin, 1969), yet also this assumption was not empirically tested so far.

There are several definitions of curiosity and ways of understanding this construct. A trait curiosity is a relatively stable disposition, whereas curiosity understood as a state is closely related to easily changing affects, influenced by emotions and stimulating the search for new sensations and experiences. For theoretical reasons it is important to distinguish curiosity from closely related constructs – embodied in the psychology of personality, motivation

and emotion – such as Openness to Experience, intrinsic motivation and flow (Csikszentmihalyi, 1997). In this article curiosity is treated as a trait – a (relatively) stable disposition to feel curiosity and be curious. Kashdan and Silvia (2009) defined curiosity as follows:

> Curiosity can be defined as the recognition, pursuit, and intense desire to explore novel, challenging, and uncertain events. When curious, we are fully aware and receptive to whatever exists and might happen in the present moment. Curiosity motivates people to act and think in new ways and investigate, be immersed, and learn about whatever is the immediate interesting target of their attention. This definition captures the exploratory striving component and the mindful immersion component. By focusing on the novelty and challenge each moment has to offer, there is an inevitable (however slight) stretching of information, knowledge, and skills. When we are curious, we are doing things for their own sake, and we are not being controlled by internal or external pressures concerning what we should or should not do. (p. 368)

Perceiving curiosity as a force that motivate "people to act and think in new ways" (Kashdan & Silvia, 2009, p. 368) makes it conceptually close to little-c creativity, understood as creative thinking and such personality and self-concept variables (Feist, 1998), as openness, dynamism or intellect. Hence not surprisingly curiosity is usually associated with Openness to Experience or is even regarded as its' sub-trait (McCrae, 1987). Kashdan, Sherman, Yarbro, and Funder (in press) have made empirical arguments for distinguishing these two constructs one from another, thereby demonstrating their partial independence. The consistent and strong correlations with Extroversion (Kashdan, Afram, Brown, Birnbeck, & Drvoshanov, 2011; Kashdan et al., 2009) and consistently negative associations with Neuroticism suggest also that curiosity may be positively associated with the meta-trait Plasticity: a higher-order personality factor composed of Openness to Experience and Extraversion (DeYoung, Peterson, Séguin, & Tremblay, 2008); its associations with Stability (a higher-order personality factor composed of Emotional Stability, Agreeableness and Conscientiousness), however, are less clear.

Associations between curiosity and Openness to Experience (sometimes even considered a personality proxy of creativity, e.g., Martindale, 1989) are well established. Openness is associated with both stretching (seeking out new experiences) – r = .50 – and embracing (acceptance of unpredictability) – r = .43 (Kashdan et al., 2009, p. 992). Similarly, a relationship between intrinsic motivation and creative abilities, styles, and the creative personality is usually found (Grant & Berry, 2011; Joy, 2004). On the other hand however, recent studies (Gilson & Madjar, 2011) demonstrated positive associations between intrinsic motivation and radical creativity (oriented toward changing paradigms, see also Sternberg, Kaufman, & Pretz, 2002), while extrinsic motivation was positively associated with incremental, step-by-step creativity. Hence, it may be speculated that curiosity (strongly connected with intrinsic motivation) plays a more important role for radical than incremental creativity.

To date, the relationship between curiosity and creativity self-concept constructs, such as creative self-efficacy (CSE) and creative personal identity (CPI) has not been established. As Kashdan and Fincham (2002, p. 373) have stated: "systematic investigation of the role of curiosity in the development of creative cognitive processes, creative personalities, and the production of creative works is urgently needed". Schweizer (2006) proposed the Novelty Generation Model (NGM) which integrates the neuropsychological, personality and motivational aspects of novelty-seeking and creativity. She treats curiosity as the main factor that influences novelty-seeking, which then translates into creativity. This model also assumes an important role of such personality factors as Openness to Experience and Extraversion. Schweizer's presuppositions were not tested in an original article however. The study presented in this article may – at least in part – answer this call and fill the gap observed in the literature.

In the creativity literature, CSE, defined as an individual's set of beliefs that she or he is able to solve problems requiring creative thinking and to function creatively, is becoming an increasingly popular area of research (Beghetto, 2006; Beghetto, Kaufman, & Baxter, 2011; Choi, 2004; Jaussi, Randel, & Dionne, 2007; Karwowski, 2011; Lim & Choi, 2009; Tierney & Farmer, 2002, 2011). Understanding the structure of the predictors of CSE may have important practical implications for both education and counseling. Previous studies have demonstrated that CSE can be supported by the transformational leadership of a teacher (Beghetto, 2006; Karwowski, 2011a) or manager (Tierney & Farmer, 2002), and that it is associated with creative thinking (Karwowski, Lebuda, & Wiśniewska, in press) and the big five factors of personality: positively with Openness to Experience, Extroversion, Conscientiousness, and Agreeableness and negatively with Neuroticism (Karwowski, Lebuda, Wiśniewska, & Gralewski, in press).

The purpose of this article is to extend existing findings and show the relationship between CSE and curiosity, understood both as a general trait and a higher-order construct which consists of stretching and embracing (Kashdan et al., 2009).

Jaussi et al. (2007) have suggested that CSE develops under the influence of an individual's belief that creativity is an important element of the individual's functioning, and this belief – defined as CPI – may further enhance the positive effects of CSE in task-specific situations. If the CSE and the CPI develop as a result of an individual's experiences, it is worthwhile to seek their correlates which are also responsible for the wealth and intensity of experience. To date, substantial and positive relationships between CSE / CPI and Extroversion and Openness to Experience have been demonstrated – although the big five personality factors explained only one-fifth of the total variance of these constructs. Validation studies of a scale developed to measure CSE and CPI (Karwowski, Lebuda, & Wiśniewska, in press) have shown that both CSE and CPI possess positive correlations with emotional intelligence, intrinsic motivation, and self-esteem. The possible associations between CSE and CPI with trait curiosity have not been studied. CSE and CPI are conceptually related, yet not synonymous. CSE deals with the more dynamic perception of one's creative abilities in a specific task or situation, whereas CPI defines the importance of creativity in one's self-definition. Both however are important creative self-concept variables, and both constitute the higher-order creative self factor.

The Present Study

The main aim of the present study is to examine the pattern of relationships between the trait curiosity and the creative self. The creative self is defined as a higher-order, self-concept factor composed of belief in one's creative capacities (CSE) and importance of creativity for self-identity (CPI).

Reliable and substantial correlations between sub-factors of curiosity – i.e., stretching and embracing – and CSE and CPI were hypothesized (H1), as were strong associations between higher-order constructs of curiosity and creative self (H2). Stronger associations between curiosity and CSE than CPI were also hypothesized. This hypothesis stems from the characteristics of both creative self-concept variables, specifically the more dynamic and malleable nature of creative self-efficacy as compared to creative personal identity (Jaussi et al., 2007).

Method

Participants

In total, *N* = 284 middle and high school students from Warsaw, Poland (55% females women, aged 13-18, *M* = 14.74, *SD* = 1.14) participated in the present study.

Measures

Creative Self-Efficacy and Creative Personal Identity. The Short Scale for Creative Self (SSCS; Karwowski, Lebuda, & Wiśniewska, in press) was used to measure CSE and CPI. The SSCS is composed of 11 items – six which measure CSE and five of which measure CPI. Creative self-efficacy is described by the following statements on the SSCS: (3) I know I can efficiently solve even complicated problems; (4) I trust my creative abilities; (5) Compared to my friends, I am distinguished by my imagination and ingenuity; (6) Many times I have proven that I can cope with difficult situations; (8) I am sure I can deal with problems requiring creative thinking; and, (9) I am good at proposing original solutions to problems. The statements describing CPI were: (1) I think I am a creative person; (2) My creativity is important to who I am; (7) Being a creative person is important to me; (10) Creativity is an important part of myself; and, (11) Ingenuity is a characteristic which is important to me. Each statement was measured on a 5-point Likert scale where 1 = definitely not and 5 = definitely yes. The internal consistency of both scales was high: α_{CSE} = .81, α_{CPI} = .90. In previous research, both scales had been characterized by high reliability and validity, as well. A two factor structure of this instrument was confirmed by confirmatory factor analysis (Karwowski, Lebuda, & Wiśniewska, in press; Karwowski, Lebuda, Wiśniewska, & Gralewski, in press), as well as by exploratory structural equation modelling (Karwowski, 2012).

Curiosity and Exploration Inventory-II. An improved version of Kashdan, Rose, and Fincham's (2004) Curiosity and Exploration Inventory, the CEI-II (Kashdan et al., 2009) was used in its Polish adaptation (Kaczmarek, Baczkowski, & Baran, 2010) to measure trait curiosity. The CEI-II consists of 10 items, five of which measure the curiosity sub-trait stretching – i.e., item 1: I actively seek as much information as I can in new situations; and item 3: I am at my best when doing something that is complex or challenging – and five which measure the sub-trait embracing – i.e., item 2: I am the type of person who really enjoys the uncertainty of everyday life; and item 4: Everywhere I go, I am out looking for new things or experiences. A 5-point Likert scale was used, where 1 = very slightly or not at all and 5 = extremely. Data presented in the original article which introduced the CEI-II showed this instrument to be highly reliable and valid, and Item Response Theory analysis confirmed that trait curiosity is effectively measured at different levels of latent trait. In this study both scales were moderately reliable (stretching: Cronbach's α = .77, embracing: Cronbach's α = .74) and showed substantial correlation (*r* = .66; *p* < 0.001; cf. Table 1).

Table 1

Descriptive Statistics and Correlations of Variables Used in the Study

	M	*SD*	1	2	3	4
1. Stretching	3.27	.75	(.77)	.66***	.57***	.52***
2. Embracing	3.45	.77		(.74)	.55***	.41***
3. Creative Self-Efficacy	3.51	.68			(.81)	.71***
4. Creative Personal Identity	3.63	.88				(.90)

Note. Cronbach's α on the diagonal in brackets. Correlation coefficient is Pearson *r*

***p < .001

Procedure

All participants were treated in accordance with the ethical guidelines set out by the American Psychological Association (2009). Prior to data collection, written consent was obtained from each adult participant or each participants' parents if the participant was under 18 years old. Participants were not rewarded for participating in the study. They and their parents were informed that they could withdraw at any time.

The questionnaires were completed in a counter-balanced order, individually in a group-administered session of 15–20 people, with each group lasting approximately 20 minutes. Any further questions were attended to during the session.

Results

Data obtained in the study were analyzed in four steps. In the first step, descriptive statistics and inter-correlations between key variables used in the study were calculated (Table 1). In the second, correlations between the latent sub-traits of curiosity and CSE and CPI were calculated using confirmatory factor analysis. Since the 5-point Likert scale which was used in both inventories is an ordinal scale – and not, as is usually assumed, a continuous one – the analysis was repeated in the third step using parcels, or averaged items per each scale (Coffman & MacCallum, 2005). In the fourth step, correlations between latent higher-order factors of curiosity and creative self were calculated. Lastly, an additional fifth step was devoted to the assessment of common method bias by fitting a one-factor model and comparing its fit to the fit of the models previously found. Structural equation modeling was used to better deal with the measurement error. This set of techniques allow for effective modeling relations between latent variables, with correction for scales unreliability (McDonald & Ringo Ho, 2002).

Descriptive statistics, correlations between scales and their reliability scores are provided in Table 1.

All scales were characterized by moderate-to-high internal consistency (Cronbach's α between .74 and .90); in the case of CSE and CPI, the reliability was high; in the case of stretching and embracing, moderate. As expected, there were reliable and substantial associations between the sub-traits of curiosity and CSE (r = .57 with stretching and r = .55 with embracing) and weaker associations with regards to CPI (r = .52 with stretching and r = .41 with embracing). Both curiosity sub-scales were strongly correlated (r = .66) as was CSE with CPI (r = .71).

The structural equation model (SEM), which consists of two confirmatory factor analyses, showed moderate fit ($\chi^2[df = 183] = 477.45$, $p < .001$; $\chi^2 / df = 2.61$; *CFI* = .88; *RMSEA* = .07, 90% CI: .065–.081; Figure 1).

Correction for measurement error, typical for SEM, allows a more reliable estimate of the associations between constructs. The correlations between the two curiosity sub-factors increased significantly (r = .92) to a level similar to the correlation between CSE and CPI (r = .82). Creative self-efficacy correlated strongly with stretching (r = .71) and embracing (r = .72). Creative personal identity was associated with both stretching (r = .62) and embracing (r = .52).

The model with parcels was shown to be better-fitted ($\chi^2[df = 21] = 38.30$; $p < .01$; $\chi^2 / df = 1.82$; *CFI* = .987; *RMSEA* = .052, 90% CI: .024–.078) than the previous one ($\Delta\chi^2 = 439.15$; $\Delta df = 162$; $p < .001$; Figure 2).

Similar to previous examinations, there were stronger associations between CSE and the curiosity sub-traits (r = .67 with embracing and r = .72 with stretching) than between CPI and curiosity (r = .62 with stretching and r = .48

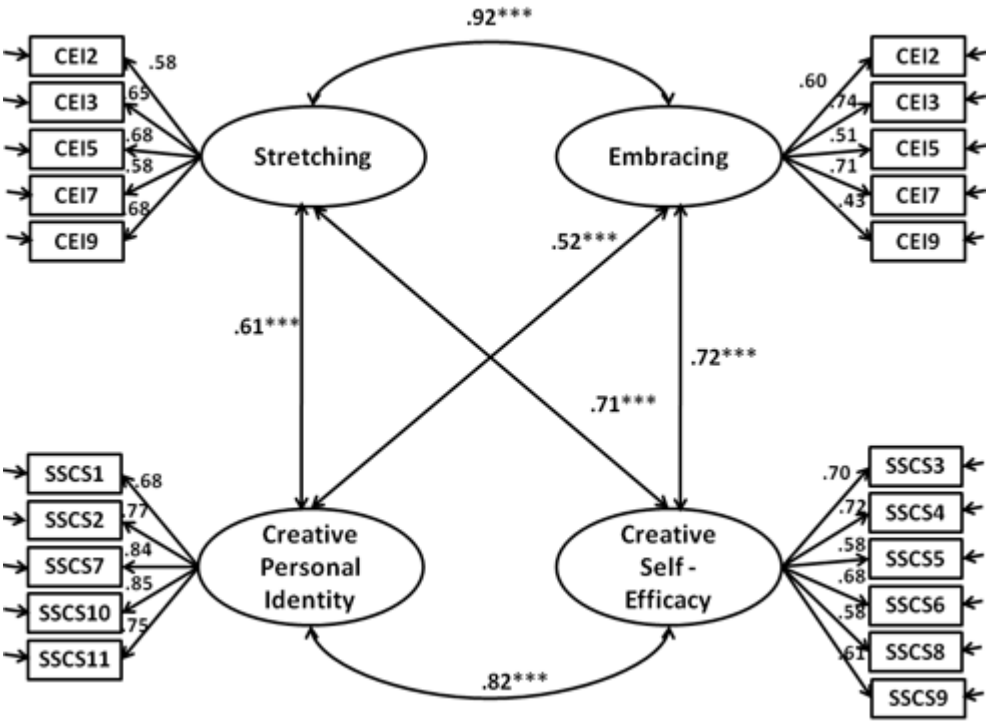

Figure 1. The relationship between stretching, embracing, creative self-efficacy and creative personal identity

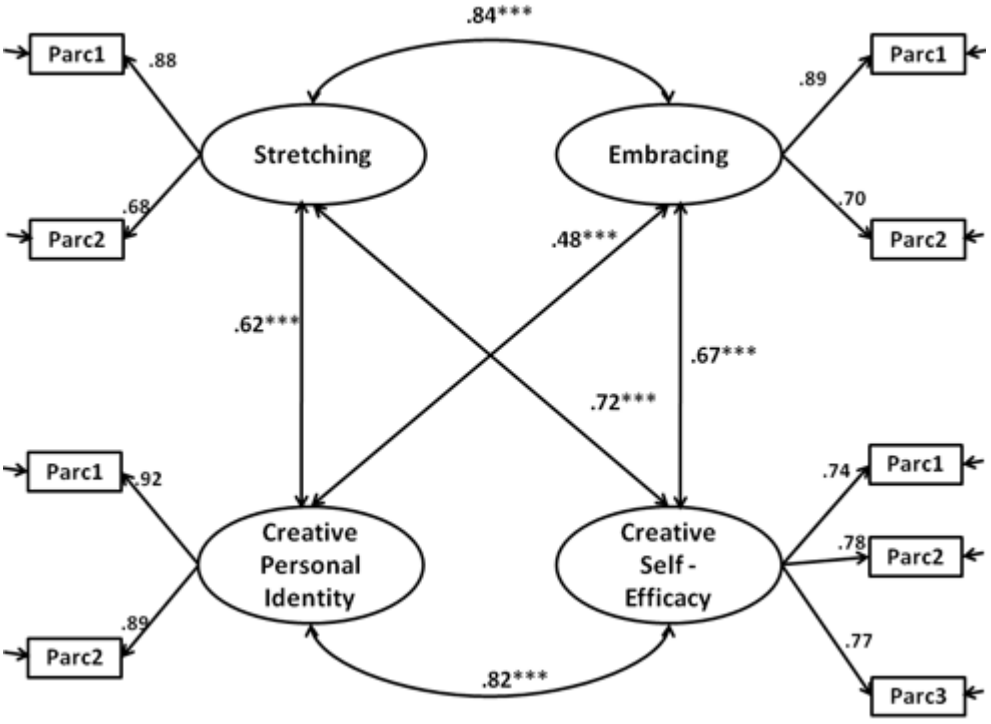

Figure 2. The relationship between stretching, embracing, creative self-efficacy and creative personal identity – model with parcels

with embracing). The strength of the CSE / CPI correlation with embracing differed significantly (z = 3.41; p < .001); the difference in correlations with stretching were also notable (z = 2.16; p = .03). It may thus be concluded that curiosity plays a more important role in CSE than it does in CPI, although associations with CPI are still strong and worthy of attention. This finding confirms the third hypothesis of this study.

To estimate associations at a more general level, hierarchical analysis was conducted with two higher-order correlated latent factors: curiosity and creative self (Figure 3). This model was well fitted to the data (χ^2[df = 22] = 43.35; p = .004; χ^2 / df = 1.97; *CFI* = .984; *RMSEA* = .056, 90% CI: .031–.081) although not as well fitted as the model previously analyzed ($\Delta\chi^2$ = 139.65; Δdf = 1; p < .001).

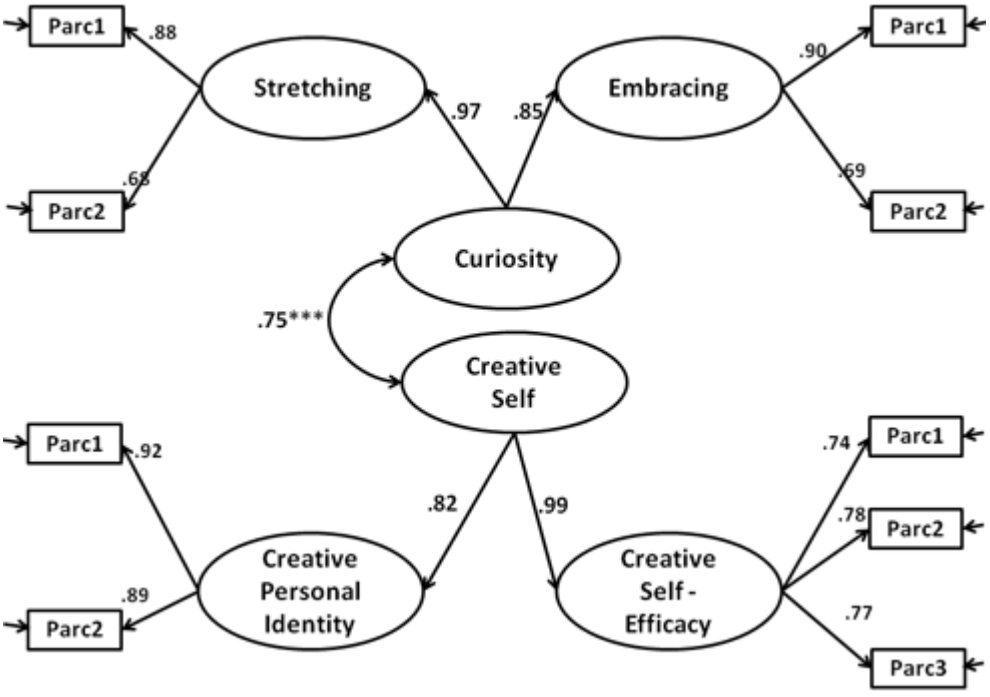

Figure 3. Hierarchical model of relationships between higher-order curiosity and creative self

Pertaining to the second hypothesis of this study, a strong and reliable association between the latent factors of curiosity and creative self was observed. Almost 60% of the shared variance of these two constructs is able to be interpreted as the result of a large overlap and a very strong effect size.[1] It may thus be concluded that an individual's curiosity is closely linked to them perceiving herself or himself as a creative person.

Assessment of Common Method Bias

A very high correlation between higher-order latent factors might raise questions about the possibly artifactual nature of this finding, as the possibility of common method bias exists. As both CEI-II and SSCS are short inventories, both of which use a 5-point Likert scale, there is a risk that the similar format of these scales influenced the results obtained. There are several ways to examine whether common method bias occurred (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003), with the so-called "Harman's single factor test" (Podsakoff et al., 2003, p. 889) – which examines the fit of a one-factor model when the factor is loaded by all variables used in the study – being among the most popular. Confirmatory factor analysis with one factor loaded by separate parcels showed

poor fit (χ^2[*df* = 27] = 303.30; $p < .001$; χ^2 / *df* = 11.23; *CFI* = .79; *RMSEA* = .18, 90% CI: .165–.202) thereby indicating that common method bias was not a problem in this study.

Discussion

Creativity helps make the world better and contributes to the development of a culture (Tsai, 2012), economy (Spencer, 2012) and individuals' well-being (Ishaq, 2006). The multitude of means by which to develop creativity is enormous (Scott, Leritz, & Mumford, 2004a), and the effectiveness of many such methods has been confirmed (Scott, Leritz, & Mumford, 2004b). People often find creativity to be an essential element of their own personality, in the form of their personal creative identity (Karwowski, 2009, 2011), which suggests that they will not only engage in creative actions and processes, but also support them – for example, in their children, students and subordinates (Plucker & Makel, 2010). It is particularly important to understand the determinants of perceiving oneself as creative or not, as these determinants may play an important role in shaping the creative self-concept, understood as both CSE and CPI.

The aim of the study presented in this article was to determine the nature of the relationship between trait curiosity and its two sub-components – stretching and embracing – with CSE and CPI. On the basis of previously established relationships between CSE / CPI and intrinsic motivation (Karwowski, Lebuda, & Wiśniewska, in press) and Openness to Experience (Karwowski, Lebuda, Wiśniewska, & Gralewski, in press) positive relationships on the part of both components with the CSE and the CPI were expected. Analysis of the relation of both self-concept variables to curiosity is worth attention, as previous studies have shown only moderate relationships of CSE / CPI with the big five personality traits (Karwowski, Lebuda, Wiśniewska, & Gralewski, in press). In accordance with the distinction proposed by Asendorpf and van Aken (2003) (see also Marsh, Trautwein, Ludtke, Koller, & Baumert, 2006), it may be argued that personality and CSE / CPI belong to two different theoretical families, developed in two different traditions – the psychology of personality and social psychology. While the big five traits are "hard core" (Asendorpf & van Aken, 2003, p. 629) variables, strongly rooted in biology (DeYoung, 2010), CSE and CPI are self-concept variables, much more malleable and susceptible to environmental influences, environmental conditions and the personality itself. In this instance, attention was given to curiosity, assuming that this theoretical construct is more malleable and may be of particular importance to CSE and CPI development. Curiosity is not merely a component of Openness to Experience and an important covariate of intrinsic motivation, but is also an important trait in its own right. Its importance in shaping the functioning of outstanding creators is well-established (Kashdan & Fincham, 2002), but little is known about its role in shaping the CSE of people without creative achievements.

The study presented in this article fills the aforementioned gap, showing a clear relationship between the constructs under investigation. The higher order factors of curiosity and creative self share nearly 60% of common variance – a sufficiently large percentage to consider them as clearly overlapping. At the same time, a more detailed analysis revealed subtle but interesting differences. Creative self-efficacy correlated with both stretching and embracing more strongly than CPI did. This suggests that both dimensions of curiosity are important for convincing people of their creative abilities. Although the correlational design does not allow for inferences regarding causality, it may be speculated that the acceptance of complexity (stretching) and a high demand for newness (embracing) make it possible to test an individual's abilities in practice, thus giving her or him more chances to enhance their CSE. The CPI was more strongly associated with the level of stretching than with that of embracing. Given the nature of the CPI dimension, and particularly its relationship with overall identity, this result is not surprising.

Stretching is connected with the search for opportunities for self-development and learning – and is therefore important to find out something about the individual. In the studies which developed the CEI-II, stronger correlations of stretching than embracing were found in the case of constructs relevant to issues of identity (Kashdan et al., 2009). Stretching correlated with a positive affect (r = .38) more strongly than did embracing (r = .20); the same was observed in case of other identity sub-components (i.e., autonomy, r = .40 versus r = .23; personal growth, r = .54 versus r = .34; purpose in life, r = .45 versus r = .24; and, self-acceptance, r = .47 versus r = .24).

The study presented in this article is not without limitations. The most important is the correlational design, which does not allow for inferences about causality. Although it may be implicitly accepted that curiosity shapes both self-concept creativity variables, in fact the reverse cannot be excluded, nor can the existence of other dimensions which shape both the trait curiosity and the creative self – especially Openness to Experience. Another limitation may be seen in the nature of both scales used in this study. While both were reliable and other studies have demonstrated their validity (Karwowski, Lebuda, & Wiśniewska, in press; Kashdan et al., 2009), it is worth remembering that both are short scales, and both are relatively new in the literature. Further studies should therefore attempt to replicate these findings. Replication of obtained findings on different samples – especially differing in age and creative achievements – is worthwhile. As this study was conducted among youths, for objective reasons without creative achievements, it is possible that both creativity self-concept variables (CSE and CPI) and curiosity are in fact similar and form a common “creative potential factor”. Studies among people with higher level of creative achievements would be helpful to further examine the relations between them.

The conclusions from our study, however, are clear: curiosity is an essential component of the creative self. This is important news for all those who want to enhance their CSE and CPI, and thus concerns teachers, parents and managers alike.

Notes

1) It is worth noting that an exploratory model with a higher order latent factor loaded by curiosity and creative self was not successfully identified.

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